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— CYPRUS —

Cyprus Agency of Quality Assurance
and Accreditation in Higher Education,
Chair of the Council, Prof Mary Koutselini
Nicosia, Cyprus

18 July 2017

Dear Professor Koutselini,

Subject: BEng (Hons) Mechanical Engineering - External Evaluation Report, following 24th of May 2017 evaluation visit

The UCLan Cyprus team is very grateful for the supporting report by the visiting team, arising from the external evaluation event for our BEng (Hons) Mechanical Engineering. We also welcome the recommendations provided by the team, seeking to refine and strengthen the programme and its market appeal. This document presents our response and comments to the committee's recommendations, following the structure of the External Evaluation Report.

I. EFFECTIVENESS OF TEACHING WORK - AVAILABLE RESOURCES

1. Although Mathematics has been included in the admissions requirements, there is no requirement for Physics; the committee felt that Physics should be included.

We do agree that Physics is an important subject which should be included as a prerequisite for admissions to the Mechanical Engineering Programme. We would like though to state that Physics is not an admissions prerequisite to other approved Mechanical Engineering Programmes in Cyprus. Therefore, the inclusion of Physics as a prerequisite for admissions, especially for UCLan Cyprus, would establish conditions of unfair competition for our Institution. To this end we would like to ask the committee to reconsider its suggestion.

2. It is not clear what the interview process involves and what specific criteria are being used for admission of the non-qualifying applicants. Ideally it would be good if some of the applicants who meet the standard qualifications for entry were also interviewed.

Once a prospect student with non-standard qualifications applies to the programme, the admissions team will inform the course leader of the programme as well as the Head of School and an interview will be arranged with the applicant. The main purpose of the interview is to investigate whether the applicant's existing qualifications and/or work/life experience can provide him/her with the ability to cope with and benefit from the programme.

Programme entry interviews are individualized according to the specific qualifications of an applicant. For example, if an applicant does not meet the mathematics entry requirements, then a mathematics test must be taken by the candidate and in addition, during the interview, a number of questions are targeting specific mathematics knowledge necessary to successfully get through the programme.
Once the interview is conducted, the course leader along with the Head of School provide to the admissions team information on the outcome of the interview and their assessment on whether the prospect will be able to join the programme. There may be cases where the recommendation will be for a conditional acceptance to the programme (e.g. for the prospect to complete some additional classes before entering the programme).

3. **There are currently no mechanical engineering labs, although some provision has already been made in terms of space and new equipment to be purchased. On the basis of the list of equipment that was provided to the committee and their delivery dates, it is not clear how this equipment will be linked to specific learning outcomes and/or how it will be embedded in the programme of study to support specific modules. However, it is noted that the list appears incomplete for a fully functioning mechanical engineering department. For example, there is no surface characterization equipment (roughness), internal combustion engines, turbomachinery equipment, etc. Furthermore, some of the equipment listed appears suitable only for light teaching purposes and not for research purposes which might impact on project work and provision for academic staff research. It is also not clear why this particular list of equipment was selected, under what criteria, especially given the fact that there is no academic staff in place to support core mechanical engineering subjects.**

The University has two existing Engineering labs and a third one is under construction. The existing labs can cover the needs of Year 1 and Year 2 modules and the new one will be able to cover the needs of Year 3 and Year 4. Additionally, expansion of equipment in the existing laboratories is already planned to cover additional needs of Year 3 and Year 4 modules.
Following the committee's recommendations and discussion during the validation event, an updated list of equipment was developed along with a mapping of specific equipment to programme modules, to demonstrate the need of equipment for each module. The updated equipment list was developed after external consultation with two Mechanical Engineering experts with several years of academic experience in the delivering of mechanical engineering programmes as well as the UCLan UK course leader who is responsible for the development of the mechanical engineering labs in UCLan UK for the corresponding programme.
A summary list of the allocation between the existing equipment and the additional equipment to be purchased with the programme modules is provided below:

Title	***Equipment***
Statics and Strength of Materials	▪ *Computerised Universal Testing Machine* ▪ *Combined tension/compression tester ASTMC39 (AASHTO) 1500kN, 2000kN and 3000kN caps* ▪ *Fatigue Test Machine* ▪ *Torsion Test Machine* ▪ *Bending Test Machine*
Introduction to Materials Science	▪ *Optical and Metallurgical Microscope* ▪ *Hardness Tester / Hardness Testing Machine* ▪ *Roughness measurement device*

	▪ *Non-destructive testing equipment (Liquid penetrant, Ultrasound, Magnetic Particle)*
Drawing and CAD	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Autodesk Autocad*
Introduction to Programming	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Microsoft Visual Studio* ▪ *Java*
Manufacturing Engineering	▪ *Rulers* ▪ *Vernier callipers/Digital* ▪ *Dial callipers* ▪ *Micrometres/digital* ▪ *Computerised Universal Testing Machine* ▪ *Electrolysis Apparatus* ▪ *Distillation Column* ▪ *Dividers, squares, vee blocks, surface gauges* ▪ *Bending, Roll & Shear machine* ▪ *Conventional Lathe Machine* ▪ *Conventional Milling Machine* ▪ *CNC Lathe Machine* ▪ *CNC Milling Machine* ▪ *Notcher* ▪ *Box Brake* ▪ *Welding Simulation* ▪ *Welding Equipment (MMA/MIG/TIG)* ▪ *Grinders/Saw/Beveling Machines*
Thermodynamics and Heat Transfer	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *ANSYS FLUENT*
Engineering Economics	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Microsoft Excel*
Electronics and Instrumentation	▪ *5x Oscilloscopes TEKTRONIX TBS1052B-EDU* ▪ *4x 0-30V DC Power Supplies* ▪ *2x 0-25V AC/DC Power Supplies* ▪ *4x Function Generators (GFG 8020, 8019)* ▪ *Decade Resistor Kits* ▪ *Decade Capacitor Kits* ▪ *Decade Inductor Kits* ▪ *10x Digital Multimeter* ▪ *4 Soldering Stations* ▪ *Variety of electronic Components (resistors, capacitors, inductors, diodes, transistors, etc.)* ▪ *2x Digital Logic Kits*

Electrical Machines	▪ *Labvolt Electromechanical Systems Simulation Software (LVSIM-EMS)* ▪ *Lab-Volt Computer Assisted Electromechanical Training System with Data Acquisition and Control (8006-1)*
Advanced Materials Science	▪ *Optical and Metallurgical Microscope* ▪ *Hardness Tester / Hardness Testing Machine* ▪ *Roughness measurement device* ▪ *Non-destructive testing equipment (Liquid penetrant, Ultrasound, Magnetic Particle)*
Dynamics and Mechanical Vibration	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Mathworks MatLab*
Fluid Mechanics	▪ *Falling ball viscometer* ▪ *Particle Drag Meter* ▪ *Venturi Meter* ▪ *Bench mounting apparatus for friction loss in a pipe* ▪ *Digital hydraulic bench* ▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *ANSYS FLUENT*
Machine Elements	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Solid Works 3D CAD*
Advanced Thermodynamics and Heat Engines	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application)* ▪ *ANSYS FLUENT* ▪ *Internal Combustion Engine (single cylinder internal combustion engine, equivalent to Gunt CT 159)*
Energy Design of the Built Environment	▪ *Computer lab (As described in Computing resource rooms and specifications - Section B14 of Application document)* ▪ *Autodesk Revit* ▪ *SBEM Software*

4. The teaching methodology in several modules appears to be simply "copypaste" even though the modules and their outcomes are completely different.

The teaching methodology in each module was revised and it was tailored to the requirements of each module. The outcomes of each module were also aligned with the outcomes of the programme. Updated information is provided for each module included in Appendix A, provided as accompanying documentation.

5. **There is large variability in the assessment methods from course to course in terms of the weight given in final exam and course work. The committee felt that, although some discretion can be exercised by academics, it would be good if there was some degree of harmonization.**

The course teams took a holistic approach to the design of their assessment strategy, ensuring a diet of assessment driven by pedagogic best practice in the subject area including the use of appropriate formative assessment for student learning. The course assessment strategy was clearly articulated, and it ensures that a suite of formative assessment activities are embedded across the curriculum to support students' learning and to provide feedback to students on their progress prior to the measurement and grading of learning through the summative assessment of the module learning outcomes.
In order to achieve a degree of harmonization in the assessment methods, the following principles were adopted for all modules:

- *The maximum number of summative assessment elements for a 10 ECTS module is no more than two unless there is an accreditation rationale.*
- *The indicative word count equivalence per 10 ECTS is 4,000 and the exam duration is 3 hours or portions of these when both types exist in the diet of assessment depending on the weighting*
  Word count equivalencies for the non-word count assignments are defined, based on subject expertise, internal and external references e.g. external exam

6. **The programme coordinator / course leader must hold mechanical engineering degrees (both first degree and doctorate) and have proven track record and experience, ideally a higher rank academic. At this point in time there is no appointed programme coordinator / course leader although the recruitment process has started. Hence, this programme has been designed without a programme coordinator / course leader in place. It is appreciated that input to the design of the programme has been provided by UCLAN UK. Nevertheless, it is also noted that the equivalent UK programme is a young programme that has not received full accreditation by IMechE yet. In the document provided there are only six academics (one of which is part time) listed to support this programme, mainly of lower rank. Although they are qualified to PhD level, none of them is Mechanical Engineer by education. There are plans to recruit two additional full time members of staff (one Assistant Prof. and one Lecturer), but the committee felt that this is still not sufficient to support a demanding Mechanical Engineering programme. On the basis of the figures provided, criteria 1.3.8 and 1.3.9 is considered adequate.**

As the committee indicated in the report, during the validation event, we were in the middle of recruitment of a programme coordinator/course leader. The recruitment process has been completed and a programme coordinator has been identified to join the programme team upon successful validation of the programme. The person selected has fifteen years academic experience as a research associate and academic in various universities. The person has significant experience in the management of mechanical engineering programmes and delivery of several mechanical engineering modules. Moreover, the person has substantial research experience in the field of mechanical engineering and specifically, Energy and Fluid Mechanics and Process Engineering, with more than 100 publications in scientific journals, conference proceedings and book chapters. Last but not least, the person has significant experience with leading research projects and securing external research and industry funding.

Due to non-disclosure agreement and confidentiality issues, the full CV of the person cannot be included with this report as the person has existing commitments with another university until the end of August.

As it was indicated by the committee, once the programme is successfully validated further academic appointments will be made according to the proposed business plan. Relevant academics for these appointments have already been identified during our recruitment process (with supplementary and diverse expertise related to the programme), but further recruitment will also be carried out for the identification of additional candidates.

Last but not least, we have inter-campus mobility of faculty so that we can support on block delivery basis (for a semester) enhanced learning experience. UCLan UK faculty with wealth of experience and networking across UK and Europe are lined up to support teaching, learning and other initiatives. As it is our university practice with all of our programmes, we also engage experts from local and international industry who can co-deliver state of the art workshops and support extra curricula activities in partnership with other associations and centres of excellence.

II. PROGRAM OF STUDY AND HIGHER EDUCATION QUALIFICATIONS

1. The committee felt that some core mechanical engineering modules, like Machine Elements, Dynamics and Vibrations, Electrical Machines, etc. are either missing completely or are partially covered in other modules without enough clarity for the professional body to assess.

The programme was revised according to the committee's recommendations and feedback during the validation event, in order to include topics such as Machine Elements, Dynamics and Vibrations, and Electrical Machines as individual modules. In addition to committee's feedback, we received input for the design of the programme from our UCLan UK mechanical engineering team as well as two mechanical engineering experts with more than 40 years of combined academic and research experience in the field of mechanical engineering. Local professional Body (ETEK) requirements were also considered for the design of the revised programme.

The revised list of modules is as follows.

First Year		
Code	**Title**	**ECTS**
MP 1XXX	Statics and Strength of Materials	5
MP 1XXX	Introduction to Materials Science	5
EL 1XXX	Calculus and Linear Algebra for Engineers	10
EL 1802	Applied Physics	10
MP 1515	Drawing and CAD	10
CO 1407	Introduction to Programming	10
EF 1706	English Language II	10
Second Year		
MP 1532	Manufacturing Engineering	10

MP 1XXX	Thermodynamics and Heat Transfer	10
EL 1XXX	Probability Theory for Engineers	5
EL 1XXX	Computational Mathematics for Engineers	5
MP 1XXX	Engineering Economics	5
MP 1XXX	Systems and Controls	10
EL 1785	Electronics and Instrumentation	10
MP 1XXX	Electrical Machines	5
	Third Year	
MP 2XXX	Advanced Materials Science	10
MP 2XXX	Dynamics and Mechanical Vibration	10
MP 2XXX	Fluid Mechanics	10
SC 2153	Further Engineering Mathematics	10
MP 2XXX	Production and Operations Management	10
	One Technical Elective Module	
MP 2XXX	Energy Resources Management	10
MP 2714	Computer Aided Design and Manufacture	10
	Fourth Year	
MP 3XXX	Machine Elements	10
MP 3XXX	Advanced Thermodynamics and Heat Engines	10
EL 3996	Engineering Professionalism (COMP)	5
MP 3997	Project	15
	Two Technical Elective Modules	10
MP 3XXX	Project Management for Mechanical Engineers	10
MP 3XXX	Energy Design of the Built Environment	10
MP 3XXX	Renewable Energy Sources and Technologies	10
MP 3604	Advanced CAD	10
MP 3701	Mechanical Systems Reliability	10

In the revised version of the programme of studies, the following core mechanical engineering modules are identified:

Structural Engineering and Materials 50 – 95 ECTS:
MP 1XXX Statics and Strength of Materials (5 ECTS)
MP 1XXX Introduction to Materials Science (5 ECTS)
MP 1532 Manufacturing Engineering (10 ECTS)
MP 2XXX Advanced Materials Science (10 ECTS)
MP 2XXX Dynamics and Mechanical Vibration (10 ECTS)
MP 3XXX Machine Elements (10 ECTS)
3 x Technical Elective Modules (30 ECTS) - Optional
MP 3997 Project (15 ECTS)

Thermofluids 30 – 75 ECTS:
MP 1XXX Thermodynamics and Heat Transfer (10 ECTS)
MP 2XXX Fluid Mechanics (10 ECTS)
MP 3XXX Advanced Thermodynamics and Heat Engines (10 ECTS)
3 x Technical Elective Modules (30 ECTS) - Optional
MP 3997 Project (15 ECTS)

General Engineering Modules (50 ECTS)
MP1515 Drawing and CAD (10 ECTS)

CO 1407 Introduction to Programming (10 ECTS)
MP 1XXX Systems and Controls (10 ECTS)
MP 1XXX Electrical Machines (5 ECTS)
EL1785 Electronics and Instrumentation (10 ECTS)
EL3996 Engineering Professionalism (5 ECTS)

Operational Management (15 ECTS):
MP 1XXX Engineering Economics (5 ECTS)
MP 2XXX Production and Operations Management (10 ECTS)

Mathematics and Physics (40 ECTS)
EL 1XXX Calculus and Linear Algebra for Engineers (10 ECTS)
EL 1802 Applied Physics (10 ECTS)
EL 1XXX Probability Theory for Engineers (5 ECTS)
EL 1XXX Computational Mathematics for Engineers (5 ECTS)
SC 2153 Further Engineering Mathematics (10 ECTS)

English Language (10 ECTS)
EF1706 English Language II (10 ECTS)

Technical Elective Modules (30 ECTS)
MP 2XXX Energy Resources Management (10 ECTS) – [Energy Route]
MP 2714 Computer Aided Design and Manufacture (10 ECTS) – [CAD Route]
MP 3XXX Project Management for Mechanical Engineers (10 ECTS)
MP 3XXX Energy Design of the Built Environment (10 ECTS) – [Energy Route]
MP 3XXX Renewable Energy Sources and Technologies (10 ECTS) – [Energy Route]
MP 3604 Advanced CAD (10 ECTS) – [CAD Route]
MP 3701 Mechanical Systems Reliability (10 ECTS) – [CAD Route]

2. **The teaching materials are partially adequate and it is noted that the library doesn't hold hard copies of text books, specific to the modules of the course. In addition, module descriptors provide a long bibliography list without specifying what is the recommended textbook/textbooks for the module.**

As requested, below is a list of the recommended textbooks for each module in the programme. In addition to the recommended textbook which are available in the library for students to use, supplementary learning resources and reading material are provided and made available to students for each module, through Blackboard (our online educational platform).

Code	Title	Textbook
EL 1XXX	Calculus and Linear Algebra for Engineers	Jeffrey, A. (2004) Mathematics for Engineers and Scientists, Chapman and Hall/CRC. Blyth, T. S., and Robertson, E. F. (2002) Basic Linear Algebra, Springer.
EL 1802	Applied Physics	Raymond A. Serway, John Jewett, Physics for Scientists and Engineering, 9th edition 2013 ISBN -13: 978-1133947271 ISBN -10 1133947271 Hugh D. Young, Roger A Freeman, Physics, University of California, Santa Barbara 11th edition, ISBN -10 080538684X, ISBN -13: 978080 5386844
MP 1515	Drawing and CAD	Yarwood A, (2010), An introduction to AutoCAD 2011, Newnes. ISBN: 978-0080965758. Simmons C, et al, (2009), Manual of Engineering Drawing: Technical Product Specification and Documentation to British and International Standards, Butterworth-Heinemann. ISBN: 978-0750689854.
CO 1407	Introduction to Programming	Robert Sedgewick, Introduction to Programming in Java: An Interdisciplinary Approach, Addison Wesley; 1 edition (17 July 2007) [copies of the textbook are available in the library; the 1st section of the book is available at: http://introcs.cs.princeton.edu/java/home/chapter1.pdf]
MPS 1XXX	Statics and Strength of Materials	Hibbeler, R. C. (2013). Engineering Mechanics: Statics & Dynamics, 13th Edition. Pearson Education. Hibbeler, R. C. (2014). Mechanics of Materials, 9th Edition. Pearson Educa-tion.
MPS 1XXX	Introduction to Materials Science	Tilley, R. J. (2013). Understanding solids: the science of materials. Second Edition, John Wiley & Sons.
EF 1706	English Language II	Various online references and dictionaries
EL 1XXX	Probability Theory for Engineers	Chase, Warren and Bown, Fred (2000) General Statistics (4th Ed John Wiley) Crawshaw, J. and Chambers, J. (2001) A concise Course in Advanced Level Statistics (4th Edition Stanley Thornes)

EL 1XXX	*Computational Mathematics for Engineers*	*Quarteroni A., Saleri F. and Gervasio P., 2014, Scientific Computing with MATLAB and Octave, Fourth Edition, Springer.* *E. Kreyszig , Advanced Engineering Mathematics 10th Edition, 2011, Wiley*
MPS 1532	*Manufacturing Engineering*	*Timings R. L., (1998), Manufacturing Technology: Volume 1, Prentice Hall. ISBN 0582356938* *Timings R. L., (2000), Manufacturing Technology: Volume 2, Longman Publishing. ISBN 0582357977* *Kalpakjian S. et al, (2009), Manufacturing Engineering and Technology, Pearson Education. ISBN 9810681445*
MPE 1XXX	*Thermodynamics and Heat Transfer*	*Cengel, Y. A., & Boles, M. A. (2002). Thermodynamics: an engineering ap-proach. New York: McGraw-Hill.* *Cengel, Y. A. (2003). Heat transfer: a practical approach. New York: McGraw-Hill.*
MPO 1XXX	*Engineering Economics*	*Blank, L., & Tarquin, A. (1998). Engineering economy. McGraw-Hill.*
MPG 1XXX	*Systems and Controls*	*Nise, N. S. (2015). Control Systems Engineering, John Wiley & Sons, 7th Ed.*
EL 1785	*Electronics and Instrumentation*	*Bird, John, Electrical Circuit Theory and Technology, 6th ed – 2017* *William Bolton, Instrumentation and control systems - 2015*
MPG 1XXX	*Electrical Machines*	*Fitzgerald, A. E., Kingsley, C., Umans, S. D., & James, B. (2003). Electric machinery (Vol. 5). New York: McGraw-Hill.*
SC 2153	*Further Engineering Mathematics*	*Newnes Kreyszig, E. (1999) Advanced Engineering Mathematics – 8th Ed, Wiley.* *Stroud, K.A.. & Booth D.J. (2007) Engineering Mathematics – 6th Ed, Industrial Press*
MPS 2XXX	*Advanced Materials Science*	*Berns, H., & Theisen, W. (2008). Ferrous materials: steel and cast iron. Springer Science & Business Media.* *Callister, W. D., & Rethwisch, D. G. (2011). Materials science and engineer-ing (Vol. 5). NY: John Wiley & Sons.*
MPS 2XXX	*Dynamics and Mechanical Vibration*	*Hibbeler, R. C. (2013). Engineering Mechanics: Statics & Dynamics, 13th Edition. Pearson Education.* *Liang-Wu Cai (2016): Fundamentals of Mechanical Vibration. 2016, John Wiley & Sons*
MPE 2XXX	*Fluid Mechanics*	*Cimbala, J. M., & Çengel, Y. A. (2008). Essentials of fluid mechanics: fun-damentals and applications. McGraw-Hill Higher Education.*
MPO 2XXX	*Production and Operations Management*	*Gupta, S., & Starr, M. (2014). Production and Operations Management Sys-tems. CRC Press.*
MPE 3XXX	*Advanced Thermodynamics and Heat Engines*	*Cengel, Y. A., & Boles, M. A. (2002). Thermodynamics: an engineering ap-proach. New York: McGraw-Hill.*

		Heywood, J. B. (1988). Internal combustion engine fundamentals (Vol. 930). New York: McGraw-Hill.
MPG 3XXX	*Machine Elements*	*Schmid, S. R., Hamrock, B. J., & Jacobson, B. O. (2014). Fundamentals of machine elements: SI version. CRC Press.*
EL 3996	*Engineering Professionalism (COMP)*	*A variety of references:* *Working toward sustainability: ethical decision making in a technological world - Kibert, Charles J.* *Engineering, business and professional ethics - Robinson, Simon 2007* *The commercial engineer's desktop guide - Boyce, Tim 2001* *Professi Managing innovation : integrating technological, market and organizational change - Joseph Tidd onal communication in engineering - Sales, H. E. 2009*
MP 2XXX	*Energy Resources Management*	*Skipka, K. J., & Theodore, L. (2014). Energy resources: availability, man-agement, and environmental impacts (Vol. 11). CRC Press.*
MP 2XXX	*Project Management for Mechanical Engineers*	*Smith, N. J. (2007). Engineering project management. Willey-Blakcwell.*
MP 3XXX	*Energy Design of the Built Environment*	*ASHRAE (2013). Handbook of Fundamentals. ASHRAE, US.*
MP 3XXX	*Renewable Energy Sources and Technologies*	*Kaltschmitt, M., Streicher, W., & Wiese, A. (Eds.). (2007). Renewable ener-gy: technology, economics and environment. Springer Science & Business Media.*
MP 3604	*Advanced CAD*	*M.Lombard – SolidWorks 2013 Bible – Wiley Publishing, inc 2013 – ISBN: 1118508408*
MP 3701	*Mechanical Systems Reliability*	*Bertsche B, "Reliability in Automotive and Mechanical Engineering", Springer, 2008* *Recommended purchase: Beek, A van, "Advanced Engineering Design: lifetime performance and reliability", TU Delft, 2006*

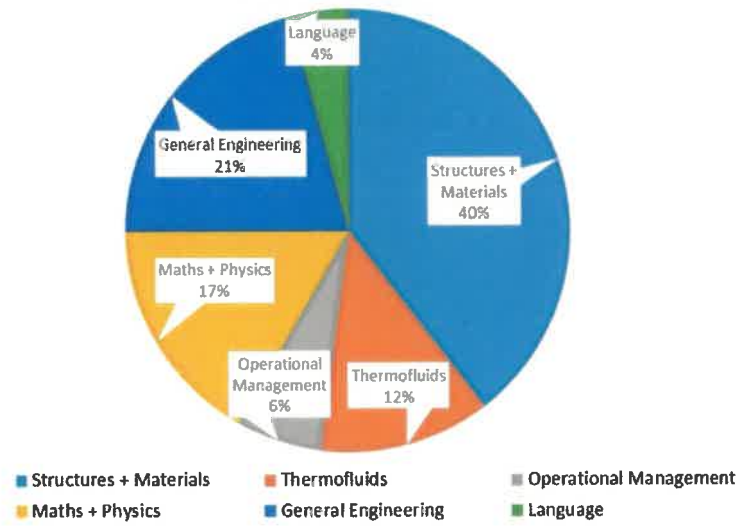
3. **It is not clear how the existing equipment and the equipment to be purchased is linked to specific laboratory sessions and specific modules. Moreover, there are critical pieces of laboratory equipment missing, as also noted earlier. Similar comments can be found in previous sections on the method of assessment.**

This has already been addressed. Please see Response #3 for the match of equipment per module.

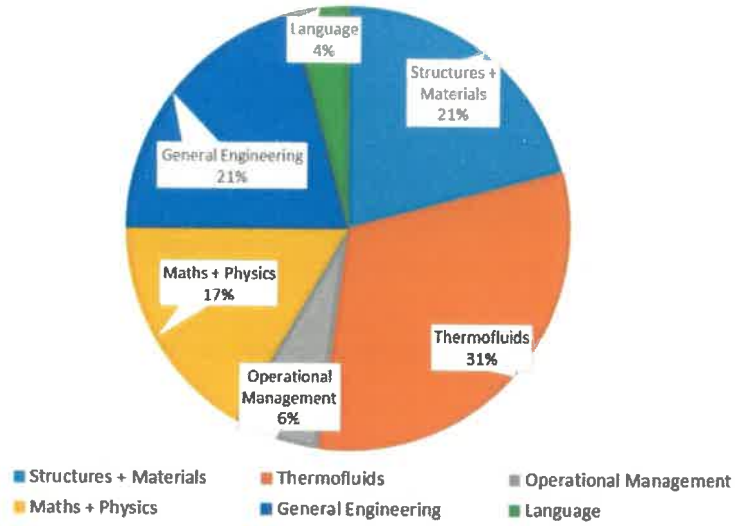
4. **Although there is clarity with respect to the expected learning outcomes, the necessary content, teaching and learning approaches and method of assessment lack clarity as commented on in previous sections. The committee felt that the ECTS allocated to some modules are not well thought through. For example there are 20 ECTS allocated to English Language in the first year and only 5 ECTS allocated to Stress Analysis. In order to increase ECTS of some proposed core engineering modules and also to allow the introduction of new core engineering modules currently not in the proposed programme, it is suggested that the English Language module is run as an extra-curricular activity in the first year for those students who need it or the language admission criteria are modified requiring a higher IELTS score.**

The course structure has been revised in order to satisfy an appropriate balance between the different mechanical engineering disciplines. The course committee feels that the current structure of the programme guarantees a comprehensive and appropriate handling of the main concepts in the field of mechanical engineering. Based on the structure provided in Response #7, the following discipline balance is achieved:

DISCIPLINE ALLOCATION – STRUCTURAL SPECIALIZATION



DISCIPLINE ALLOCATION – ENERGY SPECIALIZATION



5. There is no consistency as to which prerequisites apply to specific modules.

All modules have been updated to include any prerequisites. Below is a summary table for easy reference.

Structural Engineering and Materials:

Module	***Prerequisite***
Manufacturing Engineering	*Statics and Strength of Materials*
Advanced Materials Science	*Introduction to Materials Science*
Dynamics and Mechanical Vibration	*Statics and Strength of Materials* *Manufacturing Engineering*
Machine Elements	*Drawing and CAD* *Statics and Strength of Materials* *Dynamics and Mechanical Vibration*

Thermofluids:

Module	***Prerequisite***
Advanced Thermodynamics and Heat Engines	*Thermodynamics and Heat Transfer* *Fluid Mechanics*

Operational Management:

Module	***Prerequisite***
Production and Operations Management	*Engineering Economics*

Mathematics and Physics

Module	***Prerequisite***
Probability Theory for Engineers	*Calculus and Linear Algebra for Engineers*
Computational Mathematics for Engineers	*Calculus and Linear Algebra for Engineers*
Further Engineering Mathematics	*Calculus and Linear Algebra for Engineers* *Probability Theory for Engineers* *Computational Mathematics for Engineers*

Technical Elective Modules

Module	***Prerequisite***
Energy Resources Management	*Thermodynamics and Heat Transfer*
Project Management for Mechanical Engineers	*Engineering Economics*
Energy Design of the Built Environment	*Thermodynamics and Heat Transfer*
Renewable Energy Sources and Technologies	*Thermodynamics and Heat Transfer*
Computer Aided Design and Manufacture	*Drawing and CAD*
Advanced CAD	*Computer Aided Design and Manufacture*

6. According to the documentation the committee received, no general education courses are offered in the programme.

In the current programme structure, a total of 50 out of 240 ECTS (>20%) are allocated to general engineering modules, as follows:

General Engineering Modules (50 ECTS)
MP1515 Drawing and CAD (10 ECTS)
CO 1407 Introduction to Programming (10 ECTS)
MPG 1XXX Systems and Controls (10 ECTS)
MPG 1XXX Electrical Machines (5 ECTS)
EL1785 Electronics and Instrumentation (10 ECTS)
EL3996 Engineering Professionalism (5 ECTS)

The students have also the option of choosing three technical elective modules of 30 ECTS from a given pool of modules, which includes also modules of general engineering education.

7. It is noted that the content of some of the modules, for example Fluid Mechanics, is too broad to achieve the expected learning outcomes within the ECTS allocated. On top of that there are critical parts missing, e.g. the Navier-Stokes equations are missing from the Fluid Mechanics module descriptor.

The overall content of the course has been revised based on the comments of the committee. Concerning the module of Fluid Mechanics, a section concerning the differential analysis of fluid flow and the Navier Stokes equation was added. As for the comment for the broad scope of courses, the committee should consider the fact that the modules of the programme are mainly year-long courses of 10 ECTS. To this end it is expected that the lecture material will be extended in comparison to other similarly entitled semester modules of 5 or 6 ECTS offered at other accredited local programmes as well as international programmes.

8. Methods that could be designed to cater for students with special needs were not provided. This was also scored as N/A in the internal evaluation document.

With regard to the support of students with special needs we would like to inform you that when a student is going through their admissions process and they have declared that they have a learning or other disability, the admissions officer notifies the student support office.

The student support service requests all documentation in relation to their special needs and particularly provisions offered from previous educational institutions. These are evaluated by the Senior Student Support Officer (Educational Psychologist) in collaboration with the course leader to which the prospective student is applying and a decision is made in relation to the provisions which can be made to the student and these are normally in line the provisions that have previously been made for them at prior educational institutions.

The agreed provisions are listed in a report which is forwarded to the applicant asking them to agree that the provisions offered will be sufficient for them to engage or continue in higher education.

As examples:

- *students are allowed to record their lecturers, either using a recorder we have provided or their own personal device.*
- *25% extra time during exams or class tests*
- *completing their examination or assessment in a separate room using a laptop provided for completing the exam*
- *access to services that will enhance the student's academic achievement eg offering proof reading/study skills support/language support through the WISER service*
- *access to a weekly counselling service with a Clinical Psychologist – additional appointments may be arranged as necessary*
- *lecturers are given guidance on leniency related to grammar and spelling mistakes*
- *in cases of physical disabilities, the building is wheelchair friendly; there are adapted access points, wide corridors, doorways etc*

9. The proposed programme of study in UCLan Cyprus is not immediately compatible with corresponding programs abroad. Similarly it is not compatible with corresponding programmes in Cyprus.

An exercise was carried out to define the compliance of the proposed programme with the approved programmes in Cyprus of the public Universities. With regard to the core disciplines of Mechanical Engineering, namely structural engineering and materials, thermofluid science and operational management. The programme committee feels that there is a good agreement between the structure of the proposed programme and the structure of the ongoing programmes. This compliance is justified as follows:

Structural Engineering and Material:
UCLan Cyprus: 50 ECTS
MPS 1XXX Statics and Strength of Materials (5 ECTS)
MPS 1XXX Introduction to Materials Science (5 ECTS)
MPS 1532 Manufacturing Engineering (10 ECTS)
MPS 2XXX Advanced Materials Science (10 ECTS)
MPS 2XXX Dynamics and Mechanical Vibration (10 ECTS)
MPS 3XXX Machine Elements (10 ECTS)
University of Cyprus: 49 ECTS

MMK 125 Statics (5 ECTS) *MMK 225 Dynamics (5 ECTS)* *MMK 227 Vibrations (6 ECTS)* *MMK 256 Stress Analysis (6 ECTS)* *MMK 345 Machine Elements (6 ECTS)* *MMK 346 Engineering Design (6 ECTS)* *MMK 155 Materials Science 1 (5 ECTS)* *MMK 255 Materials Science 2 (5 ECTS)* *MMK 348 Construction Processes (6 ECTS)*
Cyprus University of Technology: 55 ECTS *MEM 107 Introduction in Mechanics (6 ECTS)* *MEM 211 Mechanics – Statics (5 ECTS)* *MEM 221 Mechanics – Dynamics (5 ECTS)* *MEM 414 Mechanics - Stress Analysis (5 ECTS)* *MEM 326 Mechanics - Machine Elements (6 ECTS)* *MEM 428 Mechanics – Vibrations (5 ECTS)* *MEM 112 Introduction in Materials Science (6 ECTS)* *MEM 214 Engineering Materials (6 ECTS)* *MEM 215 Engineering and Materials Control (6 ECTS)* *MEM 336 Composition of Advanced Materials (5 ECTS)*

Thermofluids
UCLan Cyprus: 30 ECTS *MPE 1XXX Thermodynamics and Heat Transfer (10 ECTS)* *MPE 2XXX Fluid Mechanics (10 ECTS)* *MPE 3XXX Advanced Thermodynamics and Heat Engines (10 ECTS)*
University of Cyprus: 35 ECTS *MMK 215 Thermodynamics I (5 ECTS)* *MMK 217 Heat Transfer (6 ECTS)* *MMK 315 Thermodynamics II (6 ECTS)* *MMK 318 Heat Engines (6 ECTS)* *MMK 216 Incompressible Fluids Mechanics II (6 ECTS)* *MMK 316 Incompressible Fluids Mechanics II (6 ECTS)*
Cyprus University of Technology: 33 ECTS *MEM 212 Introduction to Thermodynamics (5 ECTS)* *MEM 217 Applied Thermodynamics (6 ECTS)* *MEM 323 Heat Transfer (5 ECTS)* *MEM 439 Internal Combustion Engines (5 ECTS)* *MEM 321 Fluid Mechanics I (6 ECTS)* *MEM 460 Fluid Mechanics II (6 ECTS)*

Operational Management
UCLan Cyprus: 15 ECTS *MPO 1XXX Thermodynamics and Heat Transfer (10 ECTS)* *MPO 2XXX Production and Operations Management (10 ECTS)*
Cyprus University of Technology: 16 ECTS *MEM 216 Management and Engineering Economics (5 ECTS)* *MEM 311 Industrial Production I (6 ECTS)* *MEM 421 Industrial Production II (5 ECTS)*

10. Although the University has procedures in place and has conducted a feasibility study, the suggested programme of study possesses risks in its current form because it does not fully comply with professional body accreditation.

The programme was re-designed based on the committee's comment and based on the local professional body (ETEK) requirements, having very similar structure as other Mechanical Engineering programmes in Cyprus which are already recognized by ETEK.

III. RESEARCH WORK AND SYNERGIES WITH TEACHING

1. The committee cannot comment on research funding relevant to mechanical engineering, since there are no such full time academics locally involved with this programme yet. Student training in research processes is procedurally accounted for by the final year project only.

The proposed programme in Mechanical Engineering at UCLan Cyprus targets the cutting edge research trends in Mechanical Engineering, with the scope to maintain the educational content of the course in line with the research challenges of the engineering community. The Programme is tailored to focus on two main fields of Mechanical Engineering, namely the thermofluid-energy field and the design-structural field. The research agenda of the energy related activities of the programme is anticipated to include the main research subjects of the field including technologies for efficient and clean energy conversion and utilization. The design field will aim to enrich the understanding and optimization of the mechanical and dynamical response of material systems, as well as to develop novel engineering design aspects.

The programme aims to recruit at least two additional academics with a relevant background in novel and sustainable energy technologies and in smart management of energy resources either in the built of in the industrial sector, as well as in materials science and engineering design with the use of advanced tools and techniques.

With regards to the existing personnel of the course, the team has a strong background in the fields of spatio-temporal wave propagation, signal processing, software engineering, self-adaptive methods and advanced mathematical modelling. These fields can support state-of-the-art research in several Mechanical Engineering fields including energy management in smart cities, novel and cost effective production techniques and development of novel engineering applications aligned with mechanical engineering units. All these elements are embedded into the curricula of the course modules and are supported by the relevant hardware and software infrastructure.

IV. ADMINISTRATION SERVICES, STUDENT WELFARE AND SUPPORT OF TEACHING WORK

1. The business plan that was submitted with the application was inaccurate and incomplete although the committee were told that it would be updated.

The business plan was revised as follows:

EXPECTED CASHFLOW ANALYSIS FOR YEARS 2017 TO 2023		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
INCOME	Number of students	15	30	45	60	60	60
Fee Income	Fees/Student	9,950	9,950	9,950	9,950	9,950	9,950
	TOTAL INCOME	149,250	298,500	447,750	597,000	597,000	597,000
Mitigation	Agent fees & discounts & withdrawals 6.5%	-9,701	-19,403	-29,104	-38,805	-38,805	-38,805
	Bad debts 8%	-15,920	-17,512	-19,104	-20,696	-22,288	-23,880
	TOTAL NET INCOME	174,871	335,415	495,958	656,501	658,093	659,685
EXPENSES							
Staffing and staff related	Assistant Professor	-40,500	-40,500	-40,500	-40,500	-40,500	-40,500
	Lecturer			-31,500	-31,500	-31,500	-31,500
	0.5 Lecturer				-15,750	-15,750	-15,750
	Per hour instructors (30Euros/hour)		-2,700	-7,200	-17,100	-17,100	-17,100
Student Expenses			-1,000	-1,000	-1,500	-1,500	-1,500
Library *		-300	-1,000	-1,000	-1,000	-750	-500
Capital costs (mainly laboratory equipment and maintenance)		-10,000	-11,800	-11,800	-11,800	-1,000	-1,000
Other-including unforeseen		-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
	TOTAL EXPENDITURE	-51,800	-58,000	-94,000	-120,150	-109,100	-108,850
	OPERATING INFLOW/OUTFLOW IN €	**€ 123,071**	**€ 277,415**	**€ 401,958**	**€ 536,351**	**€ 548,993**	**€ 550,835**

We would like to take this opportunity again to thank the external evaluation committee members for their valuable and constructive comments and suggestions towards enhancing the BEng (Hons) Mechanical Engineering programme at UCLan Cyprus. We feel that we are fully equipped to grow the course and enhance the positioning of our School, UCLan Cyprus and Cyprus as an international education hub.

We remain at your disposal for any further questions and clarifications, in relation to our responses.

Yours sincerely,

Professor Irene Polycarpou
Head of School of Sciences Engineering

Assistant Professor Marios Raspopoulos
Director of BEng (Hons) Mechanical

Professor Panikkos Poutziouris
Acting Rector, UCLan Cyprus

Cc: Mr Floros Voniatis
Chair, UCLan Cyprus Council

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