UNIVERSITI MALAYSIA PERLIS

OVERVIEW OF

OBE IMPLEMENTATION

AT THE SCHOOL OF MECHATRONIC ENGINEERING

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What is OBE?

"**Outcome Based Education (OBE)** means clearly focusing and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be able to do, then organizing the curriculum, instruction and assessment to make sure this learning ultimately happens" (Spaddy, 1994)

Overview of OBE

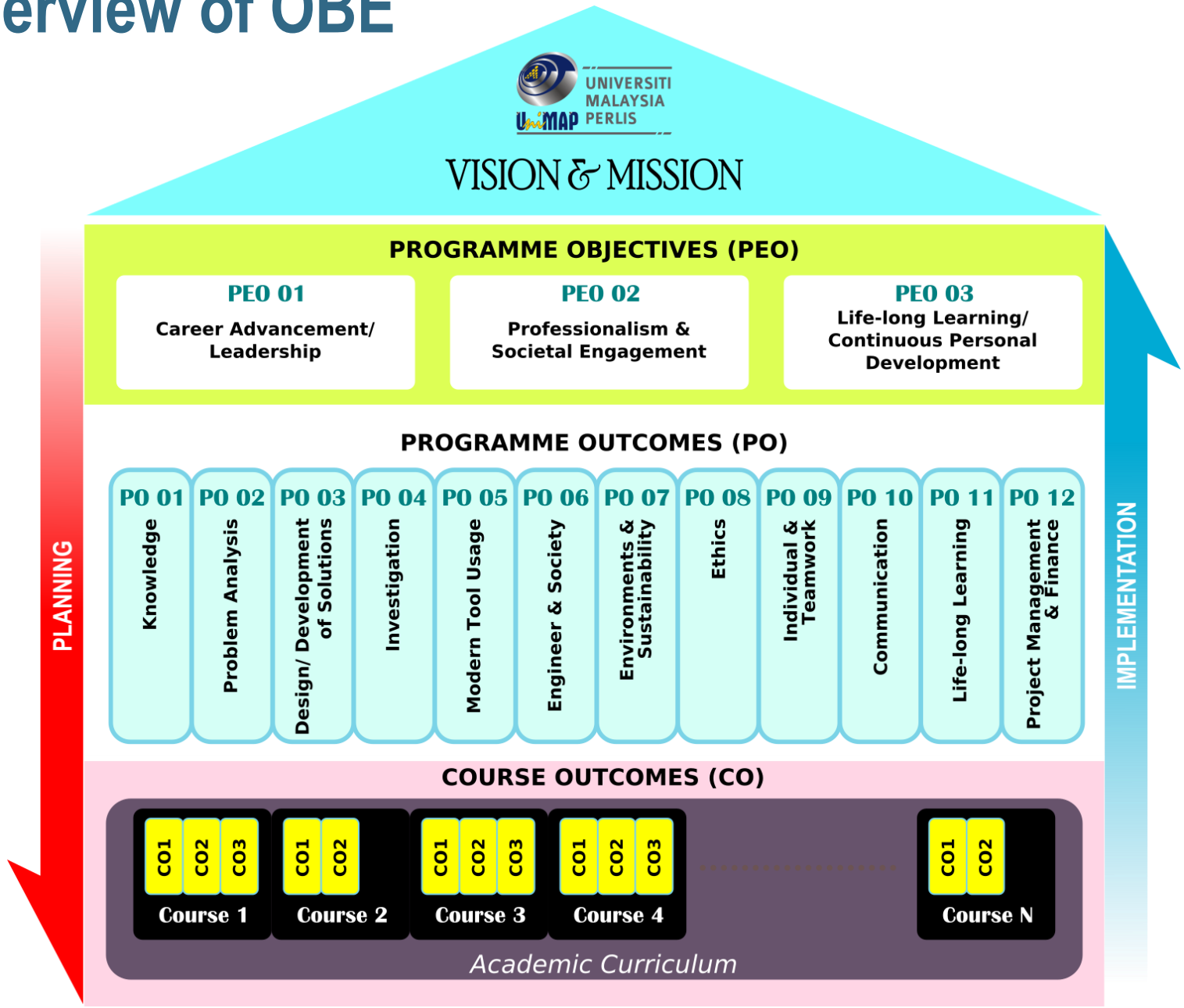
The university's and the school's desired future position or objectives, and our approach to reach it

The achievements of graduates in career and professional life 3-5 years after graduation

The expected knowledge and ability of the students by the time of graduation

The expected knowledge and ability of the students at the end of a course

Overview of OBE



Vision & Mission

UNIVERSITI MALAYSIA PERLIS

VISION

An internationally competitive academic and research institution

MISSION

To produce a holistic human that contributes to the nation's development and industrial competitiveness agenda

SCHOOL OF MECHATRONIC ENGINEERING

VISION

A leading engineering school in multi-disciplinary education and research

MISSION

To produce knowledgeable and skillful engineers ready for the national industrial demand

Programme Objectives (PEO)

Programme Educational Objectives (PEOs) are **specific statements/goals consistent with the mission and vision of the IHL**, are responsive to the expressed interest of programme stakeholders, and **describe the expected achievements of graduates in their career and professional life a few (3 to 5) years after graduation**. The PEOs must be considered in the design and review of the curriculum in a top down approach.

EAC Manual 2017

Programme Objectives (PEO)

- The SME has outlined PEOs to cater three main niches which are **Career Advancement/ Leadership**, **Professionalism & Societal Engagement** and **Life-long Learning/ Continual Personal Development (CPD)**.
- The PEOs statement are as follows:

PEO 1 **Career Advancement/ Leadership**	• Graduates who have demonstrated career advancement in the field of ****Mechatronic/ Mechanical/ Biomedical Electronic** Engineering or related engineering field
PEO 2 **Professionalism & Societal Engagement**	• Graduates who are involved in a professional body or society
PEO 3 **Life-long Learning/ Continual Personal Development**	• Graduates who pursue lifelong learning

Performance Indicator of PEO

PEO	Performance Indicator	Target
PEO1	Graduates who have demonstrated or appointed as a leader such as senior position, supervisor, specialist, manager, director, technical leader, group leader, entrepreneurial engineer or business creator, consultant or assigned multiple responsibilities	50%
PEO2	The contribution can be in terms of membership, professional or voluntary activities in any professional society such as BEM, IEM (Corporate Member), IEEE, IMechE, IET, BCS, NGO, Mercy and other reputable organization.	30%
PEO3	Pursue postgraduate studies or participate in continual development activities	30%

Assessment: alumni & employer survey, interviews etc

Programme Outcomes (PO)

Programme Outcomes describe **what students are expected to know and be able to perform or attain by the time of graduation**. These relate to the skills, knowledge, and behaviour that students acquire through the programme.

Note:

- Engineering Accreditation Council (EAC) has released a set of PO for Malaysian engineering programme in EAC Manual 2017
- This set of PO is adopted with minor improvement to suit UniMAP's engineering programme

PO 01 – PO 04

PO 01 **Knowledge**	• Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems
PO 02 **Problem Analysis**	• Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences
PO 03 **Design/ Development of Solutions**	• Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
PO 04 **Investigation**	• Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions

PO 05 – PO 08

PO 05 **Modern Tools Usage**	• Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations
PO 06 **Engineers & Society**	• Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems
PO 07 **Environments & Sustainability**	• Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.
PO 08 **Ethics**	• Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice

PO 09 – PO 12

PO 09
Individual & Teamworks

- Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

PO 10
Communication

- Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11
Life-long Learning

- Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PO 12
Project Management & Finances

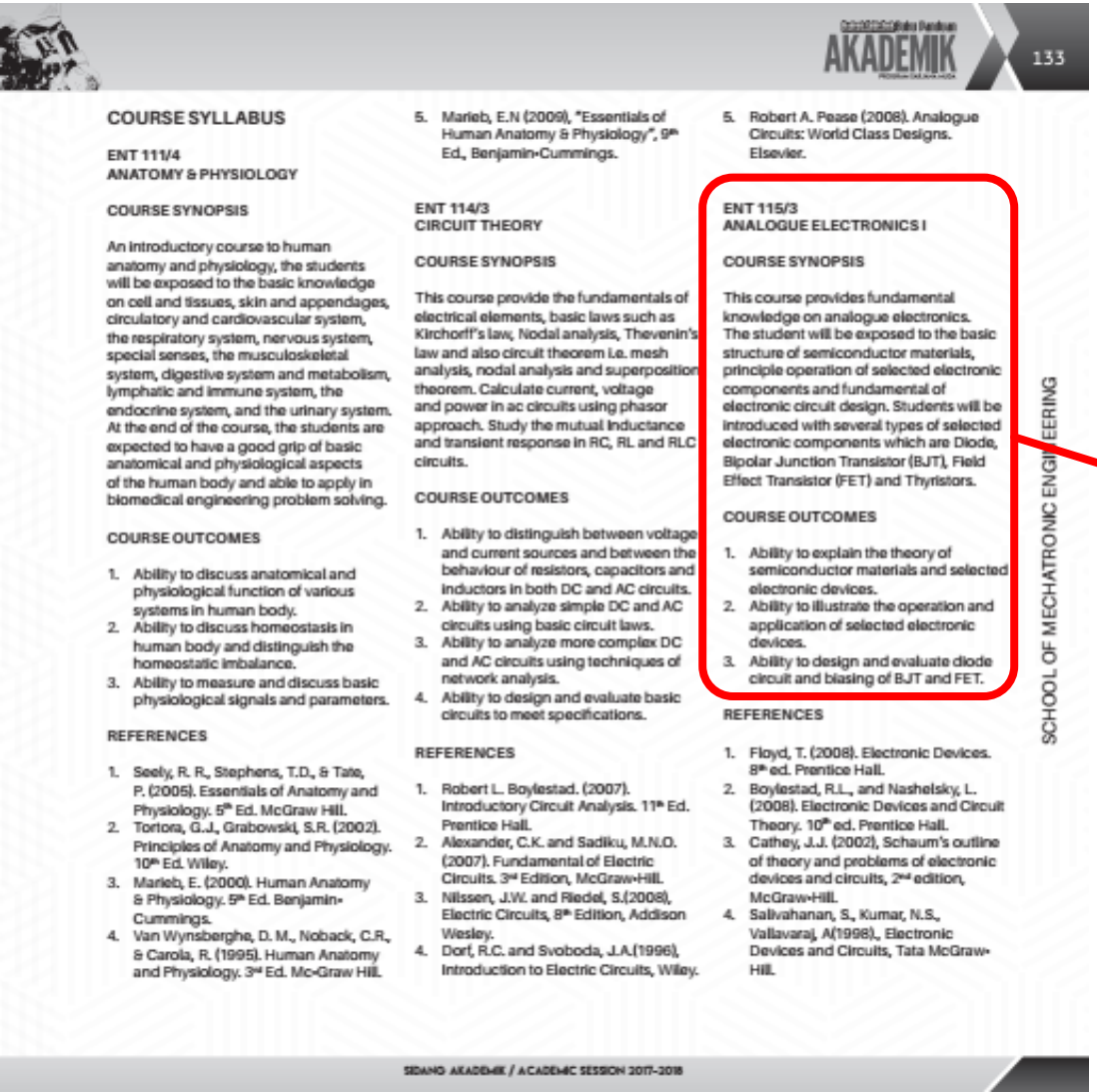
- Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

Course Outcomes (CO)

- Course Outcomes (COs) describe what students are expected to know and be able to perform or attain at the end of the course. These relate to the skills, knowledge, and behaviour that students acquire through the course.

Course Outcomes (CO) - Example

ACADEMIC GUIDE BOOK



COURSE SYLLABUS

ENT 111/4
ANATOMY & PHYSIOLOGY

COURSE SYNOPSIS

An introductory course to human anatomy and physiology, the students will be exposed to the basic knowledge on cell and tissues, skin and appendages, circulatory and cardiovascular system, the respiratory system, nervous system, special senses, the musculoskeletal system, digestive system and metabolism, lymphatic and immune system, the endocrine system, and the urinary system. At the end of the course, the students are expected to have a good grip of basic anatomical and physiological aspects of the human body and able to apply in biomedical engineering problem solving.

COURSE OUTCOMES

1. Ability to discuss anatomical and physiological function of various systems in human body.
2. Ability to discuss homeostasis in human body and distinguish the homeostatic imbalance.
3. Ability to measure and discuss basic physiological signals and parameters.

REFERENCES

1. Seely, R. R., Stephens, T.D., & Tate, P. (2005). Essentials of Anatomy and Physiology. 5th Ed. McGraw Hill.
2. Tortora, G.J., Grabowski, S.R. (2002). Principles of Anatomy and Physiology. 10th Ed. Wiley.
3. Marieb, E. (2000). Human Anatomy & Physiology. 5th Ed. Benjamin-Cummings.
4. Van Wynsberghe, D. M., Noback, C.R., & Carola, R. (1995). Human Anatomy and Physiology. 3rd Ed. Mc-Graw Hill.
5. Marieb, E.N (2009), "Essentials of Human Anatomy & Physiology", 9th Ed., Benjamin-Cummings.

ENT 114/3
CIRCUIT THEORY

COURSE SYNOPSIS

This course provide the fundamentals of electrical elements, basic laws such as Kirchoff's law, Nodal analysis, Thevenin's law and also circuit theorem i.e. mesh analysis, nodal analysis and superposition theorem. Calculate current, voltage and power in ac circuits using phasor approach. Study the mutual inductance and transient response in RC, RL and RLC circuits.

COURSE OUTCOMES

1. Ability to distinguish between voltage and current sources and between the behaviour of resistors, capacitors and inductors in both DC and AC circuits.
2. Ability to analyze simple DC and AC circuits using basic circuit laws.
3. Ability to analyze more complex DC and AC circuits using techniques of network analysis.
4. Ability to design and evaluate basic circuits to meet specifications.

REFERENCES

1. Robert L. Boylestad. (2007). Introductory Circuit Analysis. 11th Ed. Prentice Hall.
2. Alexander, C.K. and Sadiku, M.N.O. (2007). Fundamental of Electric Circuits. 3rd Edition, McGraw-Hill.
3. Nilssen, J.W. and Riedel, S.(2008), Electric Circuits, 8th Edition, Addison Wesley.
4. Dorf, R.C. and Svoboda, J.A.(1996), Introduction to Electric Circuits, Wiley.

ENT 115/3
ANALOGUE ELECTRONICS I

COURSE SYNOPSIS

This course provides fundamental knowledge on analogue electronics. The student will be exposed to the basic structure of semiconductor materials, principle operation of selected electronic components and fundamental of electronic circuit design. Students will be introduced with several types of selected electronic components which are Diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET) and Thyristors.

COURSE OUTCOMES

1. Ability to explain the theory of semiconductor materials and selected electronic devices.
2. Ability to illustrate the operation and application of selected electronic devices.
3. Ability to design and evaluate diode circuit and biasing of BJT and FET.

REFERENCES

1. Floyd, T. (2008). Electronic Devices. 8th ed. Prentice Hall.
2. Boylestad, R.L., and Nashelsky, L. (2008). Electronic Devices and Circuit Theory. 10th ed. Prentice Hall.
3. Cathey, J.J. (2002), Schaum's outline of theory and problems of electronic devices and circuits, 2nd edition, McGraw-Hill.
4. Salivahanan, S., Kumar, N.S., Vallavaraj, A(1998)., Electronic Devices and Circuits, Tata McGraw-Hill.

SCHOOL OF MECHATRONIC ENGINEERING

ENT 115/3
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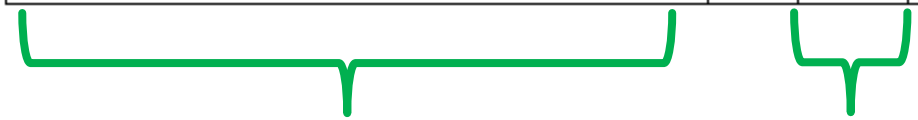
Course Outcomes (CO) - Example

All assessment that conducted for a course are related to CO and PO.

Course Outcomes (CO)	Level of Complexity	Programme Outcomes	Assessment Components & Contribution					
			Examination (70%)		Continual Assessment (30%)			
			MTE (10%)	FE (60%)	QZ (15%)	ASG (5%)	LAB (10%)	MP (0%)
CO1: Ability to **analyse** shaft, beam and member subjected to various loadings and develop a stress strain transformation analysis	C4	PO1	A1	A1	QZ1	ASG1		
		PO2		A2 A3				
	P3	PO5					LAB1	
CO2: Ability to **recognize**, **calculate** and **solve** deflection in structural analysis.	C6	PO3	A2	B1 B3	QZ2	ASG2		
	P3	PO5					LAB2	
CO3: Ability to **calculate** buckling and strain energy applied by various loadings.	C6	PO1		B2	QZ3	ASG3		
		PO2						
		PO3						



Course Outcomes

Programme Outcomes

CQI in OBE System