	EN6903	Mechanical Fundamentals

Course Aim	To provide students with an understanding of the principles of engineering mechanics

Short Title		Version	2
Faculty	EDICT	Effective From	September 1, 2016
		NQF Level	6
Credits	15	Student Contact hrs	90
Pre-requisites	None	Self-directed hrs	60
Co-requisites	None	Other directed hrs	0
Anti-requisites	None	Total learning hrs	150

Learning Outcomes	On successful completion of this course, students will be able to:	NQF Sub-strand
1	Demonstrate an understanding of SI Units, fundamental, supplementary & derived units, and apply the concepts of mass, force, moments, torque and equilibrium conditions in engineering systems	Theoretical Understanding
2	Apply the concepts of energy, energy conservation and conversion as related to mechanical engineering systems	Practical Application of knowledge
3	Analyse & solve linear motion problems involving inertia, momentum and impulse to formulate requirements of power and energy needs	Theoretical Understanding
4	Examine and solve angular motion problems including centripetal and centrifugal forces and rotational inertia for various engineering applications	Practical Application of knowledge
5	Justify & apply the laws of friction to simple engineering problems	Practical Application of knowledge

Topics / Content	• Engineering terms, SI Units, fundamental, supplementary & derived units, Mass, force, moments, torque, equilibrium conditions, etc • Vector modelling of force systems and drawing free body diagrams. Determining unknown forces using analytical and graphical techniques (triangle and polygon of forces) • Energy, work, and power. Energy forms, conservation and conversion of energy • Linear motion, F = ma, inertia, momentum and impulse • Angular motion, equations and examples, centripetal and centrifugal forces and applications. Moments of inertia, radius of gyration and applications • Friction between bodies• Combined linear & angular motion, and applications • Machines, law of the machine, mechanical advantage, velocity ratio, mechanical efficiency, limiting efficiency, overhauling
Learning and Teaching Strategies	The major emphasis is on practical achievement. Each student will complete one main practical project within a team and Labs to obtain the skills necessary to analyse and interpret results. Underpinnig knowledge will be supported by PBL based worksheets and consolidated by tests. Durring sessions students will be given group demonstrations and individual instruction as required. They will also be given the opportunity to discuss their work in detail at anytime.
Completion Requirements	To obtain a Pass grade, a student must achieve a minimum of 60% aggregated over all assessments.

Assessment	Assessment Task Description	Weight (%)	Must Pass (Y/N)	Learning Outcomes Assessed	Form of Assessment Task
	Labs: Practical labs cover a broad range of underpinning knowledge and practical skills specified in 'course content' Emphasis is on developing practical problem solving skills and analysis of results	30%'	N	1,2,3,4,5	Practical project
	Project: A practical problem based project aimed at consolidation of 'course content'	30%'	N	1,2,3,4,5	Project
	Test: Tests will demonstrate relevant underpinning knowledge gained and provide consolidation across the content range	40%'	N	1,2,3,4,5	Examination (unseen)
Assessment Method	Achievement				