University of Tripoli
Faculty of Engineering

AERONAUTICAL ENGINEERING DEPARTMENT
Graduate programs

Brief History:

The Department of Aeronautical Engineering at the University of Tripoli was established in 1975. Since then it has been in the forefront of fundamental and applied research & development with scientific and social impact in the country. The department has been involved in activities supporting our national ambitions in the field of Aerospace Engineering. Continued interaction with R&D agencies of international repute in the field of aerospace engineering has led to mutually beneficial research activities. One of the major contributions to our society has been in the form of training manpower via graduate research programs (Master of Science by research). Graduate and undergraduate programs offered are of international repute and considered the best in the country. Various alumni from this department have been at the forefront of research organizations in the country and elsewhere. Department offers a vibrant academic atmosphere which enables independent research and free exchange of ideas.

Vision

To build a strong community of dedicated graduates with expertise in the field of aeronautical engineering having a sense of responsibility, ethics and ready to participate in aerospace activities of national and global interest.

Mission

Our mission of the postgraduate program is:

1- To significantly advance knowledge, its applications and integration in aeronautical engineering.

2- To provide capable, motivated, and well-prepared students with an aeronautical engineering education of the highest quality, that will enable them to reach their maximum potential in a technological world.

Programs

The graduate program in the Aeronautical Engineering Department offers M.Sc. degree in the following programs:

Program I: Aerodynamics and Propulsion Engineering

Program II: Aircraft Structures and Design Engineering

Program III: Flight Mechanics and Control

Program I

PROGRAM	***Aerodynamics and Propulsion Engineering***
DEGREE	*M.Sc.*
OBJECTIVES	To provide students with sound knowledge of advanced topics in aircraft aerodynamics and propulsion systems, and to fulfill the needs of the institution sponsoring the students in the areas of specialization with the department assurance that the courses meet the accreditation of higher education programs of similar international universities.

Code	Title	Credits	Hours	ECTS
Faculty Requirements (3 credits)				
GE604	Advanced Mathematics	3	4	8
GE606	Applied Statistics and Computer Application	3	4	8
GE609	Numerical Methods in Engineering **	3	4	8
Department Requirements (15 credits)				
AE632	Computational Fluid Dynamics	3	4	8
AE634	Viscous Flow	3	4	8
AE642	Propulsion Systems	3	4	8
AE643	Gas Dynamics	3	4	8
AE647	Gas Turbines	3	4	8
Elective courses (7 credits)				
AE633	Experimental Methods in Aerodynamics	3	4	8
AE637	VSTOL Aerodynamics	3	4	8
AE638	Aerodynamics of Wind Rotors	3	4	8
AE639	High Speed Aerodynamics	3	4	8
AE640	Heat and Mass Transfer	3	4	8
AE697	Special Topics	3	4	8
AE698	Graduate Seminar **	1	2	10
Thesis (6 Credits)				
AE699	M. Sc. Thesis	6	*0*	*50*
Total	***TOTAL***	**31**	***0***	***124***

** *Mandatory Courses* *ECTS: European Credit Transfer and Accumulation System*

Program II

PROGRAM	***Aircraft Structures and Design Engineering***
DEGREE	*M.Sc.*
OBJECTIVES	To provide students with sound knowledge of advanced topics in aircraft structures and design, and to fulfill the needs of the institution sponsoring the students in the areas of specialization with the department assurance that the courses meet the accreditation of higher education programs of similar international universities.

Code	Title	Credits	Hours	ECTS
Faculty Requirements (3 credits)				
GE604	Advanced Engineering Mathematics	3	4	8
GE606	Applied Statistics and Computer Application	3	4	8
GE609	Numerical Methods in Engineering **	3	4	8
Department Requirements (15 credits)				
AE600	Advanced Aircraft Structure Analysis	3	4	8
AE604	Finite Element Methods	3	4	8
AE608	Aeroelasticity	3	4	8
AE610	Aircraft Vibration and Structure Dynamics	3	4	8
AE614	Composite Structures	3	4	8
AE621	Fracture Mechanics	3	4	8
Elective courses (7credits)				
AE619	Sandwich Structures	3	4	8
AE622	Aircraft Advanced Design	3	4	8
AE661	Buckling and Post buckling in Aircraft Structures	3	4	8
AE662	Aircraft Accident Investigations	3	4	8
AE697	Special Topics	3	4	8
AE698	Graduate Seminar **	1	2	10
Thesis (6 Credits)				
AE699	M. Sc. Thesis	6	*0*	*50*
Total	***TOTAL***	**31**	***0***	***124***

*** Mandatory Courses* *ECTS: European Credit Transfer and Accumulation System*

Program III

PROGRAM	*Flight Mechanics and Control*
DEGREE	*M.Sc.*
OBJECTIVES	To provide the students with underpinning knowledge of advanced topics in this field by assurance that the courses meet the accreditation of higher education programs (AHEP).

Code	Title	Credits	Hours	ECTS
Faculty Requirements (3 credits)				
GE604	Advanced Engineering Mathematics	3	4	8
GE606	Applied Statistics and Computer Application	3	4	8
GE609	Numerical Methods in Engineering **	3	4	8
Department Requirements (15 credits)				
AE630	Dynamics of Low Speed Flights	3	4	8
AE650	A/C Performance for Design, Certification and Operation	3	4	8
AE651	Aircraft Classic Control	3	4	8
AE652	Aircraft Modern Control	3	4	8
AE653	Autopilot System Design	3	4	8
AE654	Digital Control System	3	4	8
Elective courses (7credits)				
AE655	Multivariable Systems and Optimal Control	3	4	8
AE656	Systems Modeling & Simulation	3	4	8
AE660	Theory of Guidance	3	4	8
AE697	Special Topics	3	4	8
AE698	Graduate Seminar **	1	2	10
Thesis (6 Credits)				
AE699	M. Sc. Thesis	6	*0*	*50*
Total	***TOTAL***	**31**	***0***	***124***

*** Mandatory Courses* *ECTS: European Credit Transfer and Accumulation System*

Description of the Graduate Courses

- *Faculty General Courses*

GE604 Advanced Engineering Mathematics (3 *Credits* – 4 Hours)

Review of ordinary differential equations; linear differential equation of the first order; linear differential equations with constant coefficients; particular solutions by variations of parameters. Power series solutions; method of Frobenius; Legendre's equation; Fourier-Legendre Series; Bessel's equation; modified Bessel equation. Fourier methods; Fourier series; Sturm-Liouville theory; Fourier integral; Fourier transformation. Partial differential equations; heat conduction equation; separation of variables; waves and vibrations in strings; wave equation; D'Alembert's solution; longitudinal vibrations in an elastic rod; two dimensional stress systems; solution of Navier's equations by the application of Fourier transforms; Laplace equation.

GE606 Applied Statistics and Computer Application *(3 Credits – 4 Hours)*

Random variables; common discrete, continuous expectations and their applications; Sampling of the mean, hypothesis testing of the mean and variance, confidence intervals and Chi-Square procedures; Simple linear regression and correlation; precision and straight line fits; Matrix approach; multiple; Linear regression; polynomial and extra sum of squares in linear regression analysis; Transformation, weighted dummy variables and special topics in multiple regression analysis; Selecting the best regression model; Design of experiments; Single-factor and Multi-factor analysis of variance. Application of Statistical software packages such as: MINITAB, SPSS, etc.…

GE609 Numerical Methods in Engineering (3 *Credits* – 4 Hours)

Interpolation; Linear interpolation, Lagrange and Aitkin's interpolating polynomials, Difference calculus, Newton forward and backward difference formula, curve fittings, least square approximations, Fitting nonlinear curves, Cubic spline, Chebyshev polynomials, Approximation with rational function ordinary differential equations, Analytical and computer-aided solutions, Boundary conditions, Taylor series method.

- *Department Courses*

I. Program I (Aerodynamics and Propulsion):

- Compulsory Courses

AE632 Computational Fluid Dynamics (CFD) *(3 Credits – 4 Hours)*

Finite difference formulation, initial and boundary conditions, finite difference for parabolic, elliptic and hyperbolic differential equation and applications, explicit method, implicit method, iteration methods, alternating direction implicit method (ADI), splitting methods, multi-steps method, upwind formulation, TVD formulation, grid generation techniques, applications, stability analysis, introduction to finite volume formulation, introduction to commercial codes, turbulent models, Reynolds averaged equations, case studies.

AE634 Viscous Flow *(3 Credits – 4 Hours)*

Some examples of viscous fluid flow phenomena; transport, kinematic and thermodynamic fluid properties; fundamental equations of viscous fluid flow and examples of their solutions; laminar boundary layer equations; similarity, approximate and numerical solutions; prediction of boundary layer flow separation; stability of laminar boundary layer; transition to turbulence; engineering prediction of transition; physical and mathematical description of turbulence; Reynolds equations of turbulent motion; two-dimensional turbulent-boundary-layer equations; turbulent boundary layer on a flat plate; turbulence modeling in two-dimensional flow; free turbulence: jets, wakes and mixing layers.

AE642 Propulsion Systems *(3 Credits – 4 Hours)*

Dynamics and thermodynamics of perfect gases, Quasi-one-dimensional flow, thrust and efficiencies, Aircraft jet engines, Turbojets, turbofans, turboprops, Engine performance, Combustors, afterburners, Axial flow compressors, Axial flow turbines, turbine and compressor matching, Rockets, rocket flight performance, Chemical rockets, thrust chambers, nozzles, Liquid and solid propellant engines.

AE643 Gas Dynamics *(3 Credits – 4 Hours)*

Review of fundamental, reversible and irreversible process. Control volume analysis, conservation of mass, moments, conservation of energy, pressure energy equation. Compressible flow equation, h-s and T-s diagram. Perfect gas with losses, nozzle performance, diffuser performance. Norma shock wave analysis, oblique shock wave analysis and applications, Prandtl Meyer shock waves. Fanoo flow, correlation with shock waves, friction chocking. Rayleigh flow, application, correlation with shock

waves, thermal chocking. Propulsion systems, cycles analysis, propulsion equations, system efficiency, supersonic diffuser.

AE647 Gas Turbines *(3 Credits – 4 Hours)*

Course material in gas turbines Includes, aircraft propulsion system cycle, operational envelope, turbine cooling, performance prediction of sample gas turbine, performance of twin-spool engines, transient performance and control system.

- **Elective Courses:**

AE633 Experimental Methods in Aerodynamics *(3 Credits – 4 Hours)*

The role of experimental aerodynamics; wind tunnels: types, components, design basis and power losses estimation; geometric, kinematic and dynamic similarities requirements; pressure measurement; pressure transducers; pressure sensitive paint technique; flow velocity measurement, LASER-Doppler anemometer, Hot-Wire anemometer, particle imaging velocimeter; measurement of aerodynamic forces and moments; external and internal aerodynamic balances; flow visualization techniques; error analysis of wind tunnel results. Note: a set of wind tunnel experiments are scheduled as an integral part of this course.

AE637 VSTOL Aerodynamics *(3 Credits – 4 Hours)*

Types of V/STOL aircraft; helicopters: hovering, vertical ascent and descent, forward flight, autorotation; unpowered flaps: performance of wings with flaps, effect of sweepback, nose flaps; powered flaps: lift, pitching moment, drag, thrust and ground effect performance; , propeller-wing interaction; ducted propeller in axial flight and at angle of attack; fan-in-wing configuration; thrust augmentation; ground-effect machines (GEM); static stability and control of GEM.

AE638 Aerodynamics of Wind Rotors *(3 Credits – 4 Hours)*

Introduction. Nature of wind energy. Types of wind turbine, wind speed pattern, wind speed measurement and data analysis. General momentum theorem of wind rotor, rotating annular stream tube, wake rotation. Overall wind rotor design , blade element momentum theory, relative Flow . Ideal wind rotor design, Vortex theory. Performance of wind rotor, tip Loss correction, power output, blade design procedure, wind turbine control.

AE639 High Speed Aerodynamics *(3 Credits – 4 Hours)*

Introduction to high speed aerodynamics, high speed A/C components and layout. Supersonic flows around airfoils, shock waves, Normal shock waves, Oblique shock waves, Prandtl Meyer shock expansion, linear theory, Busman's theory. Finite wings in supersonic flow, conical method, singularity distribution method, application

on lifting surface. Sharp nosed body of revolution. Wing body interference, wing tail interference. Drag components.

AE640 Heat Transfer and Mass Transfer *(3 Credits – 4 Hours)*

Introduction, Two-dimensional heat conduction , transient heat conduction , Finite différence Method, Computer Project, Boudry layer , Convection heat and Mass transfer, External Flows, Internal Flows, Free convection heat transfer, Principals of radiation heat transfer, Radiation exchange between surfaces, Heat exchanger analysis , Mass transfer, Design Project Presentations.

II. Program II (Structures and Design):

- **Compulsory Courses:**

AE600 Advanced Aircraft Structural Analysis *(3 Credits – 4 Hours)*

Review of the Energy Methods; strain and complementary energy, total potential energy, detailed application to deflection problems, application to statically indeterminate structures (Beams, Frames, Pin Jointed Trusses and Rings), using unit load and Castigliano's methods. Matrix method in structure analysis. Bending of thin shells, general case of deformation of cylindrical shells, buckling of shells under axial pressure, buckling of cylindrical shells subjected to torsion. Warping of thin-walled sections (open and closed) under shear and torsion loads.

AE604 Finite Element Methods *(3 Credits – 4 Hours)*

Displacement approach. Finite element in linear analysis: derivation of elastic stiffness for some elements : (pin-jointed axial members, beams, isotropic and orthotropic plates), application of the method for stress analysis of structures, applications, finite element in buckling analysis: derivation of geometric stiffness matrices, application of buckling, finite element for vibration analysis: derivation of geometric stiffness matrices , Equation of motions in matrix form , applications of vibration analysis to (columns, plates, beams, natural frequencies for wing – fuselage system) .

AE608 Aeroelasticity *(3 Credits – 4 Hours)*

Introduction, definitions, influence of aeroelastic phenomena on design, comparison of wing critical speeds, deformations of airplane structures under static loads, deformations of airplane structures under dynamic loads, approximate methods of computing natural mode shapes and frequencies, static aeroelasticity: model for application to aileron reversal, uniform lifting surface: equilibrium equation, torsional divergence swept wings, flutter: nature of flutter, flutter of a simple system with two degrees of freedom of the bending-torsion flutter of a uniform cantilever wing, solution flutter methods, testing techniques.

AE610 Aircraft Vibration and Structural Dynamics *(3 Credits – 4 Hours)*

Review of Single and Multi-degree of freedom vibration systems using matrix formulation and force methods, Lagrange's equation for multi-degree free and forced systems, Time and frequency domain solution techniques. Vibration isolation damping treatment and dynamic absorbers. Analysis of Continuous systems: longitudinal vibration of rods, torsional vibration of rods, Euler equation for the beam, vibration of membranes, approximate numerical methods: Rayleigh method, dunkerley's equation, matrix iteration method, calculation of higher modes of vibration systems. Vibration measurement and analysis techniques.

AE614 Composite Materials (*3 Credits – 4 Hours)*

Basic definitions concerning composites. Benefits from the use of composites especially in aerospace applications. Processes, manufacture and quality control. Anisotropic, orthotropic and isotropic material properties. Lamina constitutive equations. Parameter of mutual influence of the 1st and 2nd kind. Lamination theory; symmetric and non-symmetric laminates with emphasis on the coupling effects. Analysis of stresses and strains through the thicknesses of laminates. Comparison of experimental and theoretical laminate stiffnesses, strength of laminates. Interlaminar stresses. Design of laminates. Laminate joints. Bending, buckling and vibration of laminated plates.

AE621 Fracture Mechanics *(3 Credits – 4 Hours)*

A crack in a structure and importance of crack study in design, Stresses around a crack tip, Stress intensity factors, Crack opening displacement, Cleavage and ductile fractures, Fatigue cracking and environment associated fracture, Service failure analysis, The elastic crack tip stress field , The airy stress function , The effect of finite component size on crack growth ,Elliptical cracks, Irwin plastic zone correction, Shape of the plastic zone at the crack tip, thickness effect in a cracked component, the energy principle, strain energy release rate, the criterion for crack growth , compliance in both fixed load and fixed grips conditions, plane strain fracture toughness, standard test specimens, Fracture test models in opening mode, fatigue, Crack propagation mechanism and evaluation, factors affecting fatigue crack propagation.

II Elective Courses:

AE619 Sandwich Structures (3 *Credits* – 4 Hours)

Why sandwich structures, components (faces and core), face and core materials, face and core geometries, effect of the geometric and mechanical properties of core and faces; thick faces + stiff core, thin faces + stiff core, thick faces + weak core, thin faces + weak core, shear stress distribution, bending stress distribution, honeycomb core + isotropic faces, honeycomb core + laminated faces, instability problems in sandwich columns with emphasis on the effects of various geometric and mechanical parameters. Bending and buckling using total potential energy principle.

AE622 Aircraft Advanced Design (3 *Credits* – 4 Hours)

Introduction: Vehicle classifications, system engineering, design stages, requirement, and tradeoffs, mission profiles, the design team fixed and rotary wings. Power and performance of aircraft: power available and power required, power and induced velocity, minimum power to lift ratio, specific power, power and speed. Aerodynamics: aircraft polar, characteristic points of aircraft polar, drag break down, advanced drag estimation approach. Weight estimation: weight break down, advanced weight estimation, component weight formulae, wing loading, thrust loading. Range: Range formula, optimization of range parameter, tradeoffs and sensitivity analysis. Aircraft costs: research costs, design costs, production costs, direct and indirect operating costs. Supersonic aircraft design: Determination of Design parameters: mission profile, performance requirement, configuration development, drag estimation, thrust loading and wing loading determination , Weight estimation, Sizing iteration , Determination of drag components, Lift components, Weights and thrust.

AE661 Buckling and Post-buckling in Aircraft Structures *(3 Credits – 4 Hours)*

Buckling of thin plates, Post-buckling of plates and stiffened panels. Failure criteria following semi-empirical approach. Needham and Gerard methods for predicting the failure stresses. Buckling of cylindrical shells subjected to individual or combined external and axial compressions.

AE662 Aircraft Accident Investigations *(3 Credits – 4 Hours)*

Introduction: Definitions, Notifications, the investigator, the investigation groups. Organization management. Survey: general, survey of previous accidents, IATA accident/incident classifications, and accident causes evaluations for jet and turboprop: Human factors versus flight phases, technical factors against flight phases, flight phases versus environmental factors. Statistics: Definitions, total loss rates classifications, mission profile, total loss rate classifications by flight phases, summary of turbo prop accidents (total loss), summary of jet fleet accidents (total loss),conclusion. Classifications: IATA geographic regions, classification of accidents according to type of aircraft. Final investigation report: procedure, format of the report, factual information, analysis of factual document, findings, causes safety recommendations, report appendices. IATA Annex 13 to Convention of International civil Aviation Authority: Case study (To be selected from Civil Aviation Authority accident archive).

III. Program III (Flight Mechanics and Control):

- **Compulsory Courses:**

AE630 Dynamics of Low Speed Flight *(3 Credits – 4 Hours)*

Introduction to dynamic stability of flight, static stability theory, requirements of static stability in pitching motion, full non-linear system of aircraft equations of motion, state-space format, possible trends of solution, linearization of the equations

and decoupling in to two independent sets, description of forces and moments on aircraft, concept and evaluation of stability derivatives, aircraft free response, characteristics of longitudinal motion, characteristics of lateral-directional motion, and stability boundaries, introduction to handling qualities of aircraft.

AE650 Performance for Design, Certification and Operation *(3 Credits – 4 Hours)*

Introduction to fixed wing aircraft performance: Mission profile, Performance estimation and measurement. The atmosphere and air data measurements : The atmosphere model, air data measurement techniques. Equations of motion and forces on A/C: Equations of motion for performance, forces on A/C, drag polar. Take-off and Landing Performance: Take off and landing performance, STOL/ VTOL considerations. Climb and Decent Performance: Climb/decent performance analysis, effect of wind on climb and decent. Cursing performance: Specific air range and specific endurance, jet-engined A/C, prop-engined A/C, mixed power plant A/C. Maneuvering Performance: The maneuver envelop, Transport A/C, Military A/C. Flight measurement of A/C performance: Data analysis of parametric performance, the equivalent -weight method, performance data reduction. Performance Scheduling: Flight planning, take-off performance, en-rout performance, landing performance, and fuel planning. Performance in practice: The performance summary, operational analysis, flight planning. Performance Examples of Some hypothetical A/C.

AE651 Aircraft Classic Control *(3 Credits – 4 Hours)*

Disturbance signals in a feedback control system, effects of a third pole and a zero on the second order system response, the steady state error of non-unity feedback closed loop systems, the Nyquist criterion, system bandwidth, stability of control systems with time delay, approaches to control system design, pole-zero cancellation design, PID controller design, phase-lead-lag design, robust control systems, A/C longitudinal and lateral dynamic stabilities, longitudinal and lateral responses, response to gusts.

AE652 Aircraft Modern Control *(3 Credits – 4 Hours)*

The state variables of a dynamic system, state differential equation, transfer function from the state equation, time response and the state transition matrix, analysis of state variables models, stability of state variable systems, controllability, observability, pole placement method, Ackermann's formula, state observer, longitudinal stability augmentation, lateral-directional stability augmentation, A/C dynamic coupling system analysis and stability, A/C dynamic decoupling system analysis and stability.

AE653 Autopilot System Design *(3 Credits – 4 Hours)*

Longitudinal transfer function, lateral transfer function, longitudinal and lateral modes approximations, longitudinal flying and handling qualities, lateral-directional flying and handling qualities, displacement autopilot,

autopilot modes, pitch displacement autopilot, stability augmentation, instrument landing, actuator dynamics, sensor dynamics, longitudinal control, scheduling, lateral control, automatic landing system, terrain-following control system, aircraft role, pilot opinion, rating control anticipation parameter.

AE654 Digital Control System *(3 Credits – 4 Hours)*

The z-transform, the inverse z-transform, the relation between z and s transforms, mapping the s-plane into the z-plane, bilinear transformations, discrete control system, data hold element. Sampled data control systems, Stability of digital systems, optimal discrete control use of digital computers in AFCSS, digital-to-analog conversion, analog-to-digital conversion, discrete state equations, A Lyapunov scheme, parameter adaptation scheme, digital controller design, Aircraft landing system and servomotor system.

II- Elective Courses:

AE655 Multivariable Systems and Optimal Control *(3 Credits – 4 Hours)*

Performance indices, continuous time state model, observer feedback, cost functions, Quadratic cost functions, Weighting functions, Lagrange multipliers, linear quadratic regulator, linear quadratic Gaussian control, Hamilton equations, Riccati equations, Kalman filter, optimal state space control system design, stabilizability, Lypunov stability analysis, use of Integral Feedback in linear quadratic regulator, effects of aeroelasticity on dynamic stability and response and case studies of A/C dynamic systems.

AE656 Systems Modeling and Simulation *(3 Credits – 4 Hours)*

Linear, nonlinear systems and linearization methods, time invariant and time varying systems., theory of modelling and analysis of continuous systems, the commonality of behaviour of systems, classification and proprieties of linear systems, simulations and analysis of linear and nonlinear models, dynamical behaviour of higher order dynamic systems, frequency response and state space modelling approach, sequential and continuous control strategies, FSF and RIFSF controllers, simulation block diagrams and simulation of A/C dynamic systems and optimization process.

AE660 Theory of Guidance *(3 Credits – 4 Hours)*

Fundamentals of Guidance Systems, Categories of Guidance Systems, Remote Control Guidance: Command to Line-of-Sight (CLOS), Command off Line-of-Sight (COLOS), Line-of-Sight Beam Riding Guidance (LOSBR), Homing Guidance: Active homing, Semi-active Homing, Passive homing, Homing Guidance Laws: Pursuit, Constant bearing course, Proportional navigation, Inertial Guidance, Celestial guidance, Terrestrial Guidance.

AE697 Special Topics (3 Credits – 4 Hours)

The topics are not listed in department programs and may vary from year to year according to interests of students and instructors.
M.S. students choose and study a topic under the guidance of the department coordinator. Typical contents include advanced fields of study according to recent scientific and technological developments in the related areas. Also, it could be studied from other related departments after getting the permission.

AE698 Graduate Seminar (1 Credits - 2 Hours)

This course help students to develop their research proposals, establishing and expanding their research skills and implementing their work through scholarly writing, which can be achieved through the seminar.
The seminar course must to be taken in the second semester of the registration and managed by an instructor who is responsible to prepare the final grade list of all the registered students.
Students must prepare and present their chosen topics through a scientific term paper, which can be shared and discussed with other students and department staff to gain their feedback.

AE699 M.Sc. Thesis (6 Credits-0 Hours)

Learning Objectives (Outcomes)

- Apply knowledge in varied areas of Aeronautical Engineering for higher studies, research, employment and product development.
- Attract the highest quality researchers and students to conduct a collaborative, multi-disciplinary education and research program.

- An engineering acumen in identifying, formulating, analyzing and solving complex engineering problems.
- Ability to model, analyze and simulate operations of aircraft components and parts.
- Capability of exhibiting sound theoretical and practical knowledge in core domains like aircraft structures, aerodynamics, propulsion and flight dynamics and are able to solve the related problems.
- Ability to work in team and individually.
- Ability to communicate effectively with the aerospace community using reports, presentations and documentations.
- Ability to manage the projects in various aerospace fields of structure, aerodynamics, propulsion, avionics etc.

الاعتماد			
البيان	منسق الدراسات العليا بالقسم	رئيس القسم	مدير مكتب الدراسات العليا بالكلية
الاسم			
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