Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2023-24**
SEMESTER : SEVENTH

Course Title	**AIRCRAFT STABILITY AND CONTROL**	
Sub.Code:**18AE71**	No. of Credits:**04 = 3:1:0 (L-T-P)**	No. of Lecture Hours/Week:**04**
Exam Duration:**03** Hrs.	**Max. Marks :** **CIE+ Asmt +GA + SEE=40+5+5+50=100**	Total No.of Contact Hours:**52**
Pre-requisites		

Course Learning Objectives:	
1	Understand the basics of aircraft static stability and control.
2	Understand the EOMs and stability parameters.
3	Acquire the knowledge on dynamic longitudinal, lateral and directional stability.
4	To impart knowledge on 6 DOF rigid body equation of motion.
5	To understand the concept of dynamic stability.

#	CONTENTS	Hrs..
UNIT-1	**Static Longitudinal Stability**	**10**
	Introduction to stability, Types of stability, Longitudinal static stability, stability criteria, Contribution of airframe components: Wing contribution, Tail contribution,Fuselage contribution, Power effects- Propeller airplane and Jet airplane .	
UNIT-2	**Longitudinal Control-Stick fixed and free**	**10**
	Longitudinal Control-Stick fixed: Introduction, Trim condition. Static margin. stick fixed neutral points. Longitudinal control, Elevator power, Elevator angle versus equilibrium lift coefficient, Elevator required for landing, Restriction on forward C.G. range **Longitudinal Control-Stick free** Introduction, Hinge moment parameters, Control surface floating characteristics and aerodynamic balance,Estimation of hinge moment parameters, The trim tabs, Stick-free Neutral point, Stick force gradient in unaccelerated flight, Restriction on aft C.G.	
UNIT-3	**Static Directional and Lateral Stability and Control**	**10**
	Static directional stability- rudder fixed, Contribution of airframe components, Directional control. Rudder power, Stick-free directional stability, Requirements for directional control, Rudder lock, Dorsal fin. One engine inoperative condition. Weather cocking effect.Static Lateral stability. Estimation of dihedral effect. Effect of wing sweep, flaps, and power. Lateral control, Estimation of lateral control power, Aileron control forces, Balancing the aileron. Coupling between rollingand yawing moments. Adverse yaw effects. Aileron reversal.	
UNIT-4	**6 DOF rigid body equation of motion**	**11**
	Derivation of rigid body equations of motion, Orientation and position of the airplane, gravitational and thrustforces, Small disturbance theory. Aerodynamic force and moment representation, Derivatives due to changein forward speed, Derivatives due to the pitching velocity, Derivatives due to the time rate of change of angle of attack, Derivatives due to rolling rate, Derivatives due to yawing rate.	
UNIT-5	**Dynamic Stability**	**11**
	Dynamic longitudinal stability. Types of modes of motion: phugoid motion, short period motion. Routh's stability criteria. Factors affecting period and damping of oscillations. Flying qualities in pitch. Cooper-Harper Scale. Dynamic lateral and directional stability.	

	Response to aileron step-function, side-slip excursion. Dutch roll and Spiral instability. Auto- rotation and spin. Stability derivatives for lateral and directional dynamics.	

Course Outcomes:	
1	CO1: Apply the concepts of aircraft longitudinal static stability and control for stick fixed
2	CO2: Apply the concepts of aircraft longitudinal static stability and control for stick free
3	CO3: Apply the concepts of aircraft lateral and directional static stability and control
4	CO4: Formulate EOMs and analyses stability parameters.
5	CO5: Apply the knowledge of dynamic stability

Text Books.	
1	Airplane Performance stabilityand Control, Perkins, C.D., and Hage, R.E, John Wiley , New York, 1998.
2	Flight Stability and AutomaticControl, Nelson, R.C, McGraw-Hill Book Co, 2007.

Reference Text Books.	
1	Performance, Stability, Dynamics and Control ofAirplanes, Bandu N.Pamadi, AIAA, 2nd Edition,2004.
2	Introduction to flight, John D. Anderson, Jr, McGraw-Hill, Aerospace Science Technology Editions, 2000.
3	The Principles of the Controland Stability of Aircraft, W.J. Duncan, Cambridge University Press, 2016.

Course Outcomes Mapping with Programme Outcomes & Programme Specific Outcomes.

Course Out Comes	Level of CO	Program Outcomes												Programme specific outcomes		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1		3	3	3	0	0	0	2	1	1	1	0	1	3	0	0
CO2		3	3	2	0	0	0	2	1	1	1	0	1	3	0	0
CO3		3	3	3	0	0	0	2	1	1	1	0	1	3	0	0
CO4		3	3	3	0	0	0	2	1	1	1	0	1	3	0	0
CO5		3	3	3	0	0	0	2	1	1	1	0	1	3	0	0

Assessment Details both (CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) and Semester End Exam (SEE) is 50% each. The students have to obtain a minimum of 40% marks individually both in CIE and SEE to pass.

Theory Semester End Exam (SEE) is conducted for 100 marks (3 Hours duration) and reduced to 50 Marks.

CONTINUOUS INTERNAL EVALUATION (CIE)	**Max Marks**	**Minimum Marks to be scored in CIE, to qualify to take SEE (40% individually)**

Theory	**Weightage of CIE1 and CIE2 Tests or CIE3**	**50**	**20**
	TOTAL	**50**	**20**

QUESTION PAPER PATTERN (SEE)										
Q. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
UNIT	1		2		3		4		5	
1. Two full questions (each of 20 Marks) are to be set from each unit.										
2. Student shall answer five full questions selecting one full question from each unit.										

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Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 ACADEMIC YEAR: 2023-24

SEMESTER : SEVENTH

Course Title	**FLIGHT VEHICLE DESIGN**	
Sub Code: 18AE72	**No of Credits =04** **L-T-P::3:2:0:0 (L-T-P)**	**No. of lecture hours/week : 4**
Exam Duration: 03 Hrs.	**Max. Marks : CIE+ Asmt +GA + SEE=40+5+5+50=100**	**Total No. of Contact Hours: 52**
Pre-requisites		

Course Learning Objectives:	
1	Comprehend the flight vehicle design process.
2	Acquire the knowledge of vehicle configuration and structural components.
3	Understand the selection of engine parameters.
4	Understand the stability & control and subsystems.
5	Acquire knowledge on design of subsystems.

UNIT No.	**Syllabus**	**No. of hours**
1	**INTRODUCTION**	**10**
	Overview of Design Process: Introduction, Requirements, Phases of design, Conceptual Design Process, Initial Sizing, Take-off weight build up, Empty weight estimation, Fuel fraction estimation, Take- off weight calculation. **Thrust to Weight Ratio & Wing Loading:** Thrust to Weight Definitions, Statistical Estimate of T/W. Thrust matching, Spread sheet in design, Wing Loading and its effect on Stall speed, Take-off Distance, Catapult takeoff, and Landing Distance. Wing Loading for Cruise, Loiter, Endurance, Instantaneous Turn rate, Sustained Turn rate, Climb, & Glide, Maximum ceiling.	
2	**WING AND FUSELAGE DESIGN**	**10**
	Configuration Layout & loft: Conic Lofting, Conic Fuselage Development, Conic Shape Parameter, Wing-Tail Layout & Loft. Aerofoil Linear Interpolation. Aerofoil Flat-wrap Interpolation. Wing aerofoil layout-flap wrap. Wetted area determination. Special considerations in Configuration Layout: Aerodynamic, Structural, Detectability. Crew station, Passenger, and Payload arrangements. **Design of Structural Components:** Fuselage, Wing, Horizontal & Vertical Tail. Spreadsheet for fuselage design. Tail arrangements, Horizontal & Vertical Tail Sizing. Tail Placement. Loads on Structure. V-n Diagram, Gust Envelope. Loads distribution, Shear and Bending Moment analysis	
3	**Engine Selection & Flight Vehicle Performance**	**10**
	Turbojet Engine Sizing, Installed Thrust Correction, Spread Sheet for Turbojet Engine Sizing. Propeller Propulsive System. Propeller design for cruise. Take-off, Landing & Enhanced Lift Devices :- Ground Roll, Rotation, Transition, Climb, Balanced Field Length, Landing Approach, Braking, Spread Sheet for Take-off and Landing. Enhanced lift design - Passive & Active. Spread Sheet.	
4	**Static Stability & Control**	**11**
	Longitudinal Static Stability, Pitch Trim Equation. Effect of Airframe components on Static Stability. Lateral stability. Contribution of Airframe components. Directional Static stability. Contribution of Airframe components. Aileron Sizing, Rudder Sizing. Spread Sheets. Flying qualities. Cooper Harper Scale. Environmental constraints, Aerodynamic requirements.	
5	**Design Aspects of Subsystems**	**11**

	Flight Control system, Landing Gear and subsystem, Propulsion and Fuel System Integration, Air Pressurization and Air Conditioning System, Electrical & Avionic Systems, Structural loads, Safety constraints, Material selection criteria.	

Course Outcomes:	
1	Explain the aircraft design process.
2	Analyze the aerodynamic and structural performance.
3	Estimate the various jet engine parameters.
4	Apply yhe knowledge of stability to the aircraft,
5	Explain the various sub systems used in aircraft.

Text Books.	
1	Aircraft Design - A ConceptualApproach, Daniel P.Raymer, AIAA Education Series, IV Edition, 2006.
2	Design of Aircraft, Thomas C Corke, Pearson Edition. Inc. 2003.

Reference Text Books.	
1	Introduction to Aircraft Design, John Fielding, Cambridge University Press, 2009.
2	Aeroplane Design, J Roskam.
3	Standard Handbook for Aeronautical & AstronauticalEngineers, Editor MarkDavies, Tata McGraw Hill, 2010.

Course Outcomes Mapping with Programme Outcomes & Programme Specific Outcomes.

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	1	1	2	2	2	0	3
CO2	3	3	2	3	2	1	1	2	2	2	0	3
CO3	3	3	3	3	2	1	1	2	2	2	0	3
CO4	3	3	2	3	2	1	1	2	2	2	0	3
CO5	3	3	3	3	2	2	1	2	2	2	0	3
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

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Assessment Details both (CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) and Semester End Exam (SEE) is 50% each. The students have to obtain a minimum of 40% marks individually both in CIE and SEE to pass. Theory Semester End Exam (SEE) is conducted for 100 marks (3 Hours duration) and reduced to 50 Marks.			
CONTINUOUS INTERNAL EVALUATION (CIE)		**Max Marks**	**Minimum Marks to be scored in CIE, to qualify to take SEE (40% individually)**
Theory	**Weightage of CIE1 and CIE2 Tests or CIE3**	**50**	**20**
	TOTAL	**50**	**20**

QUESTION PAPER PATTERN (SEE)									
Q. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
UNIT	1		2		3		4		5	
1. Two full questions (each of 20 Marks) are to be set from each unit.										
2. Student shall answer five full questions selecting one full question from each unit.										

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ADMISSION YEAR : 2020-21 ACADEMIC YEAR: 2023-24

SEMESTER : SEVENTH

Course Title	**AVIONICS**	
Sub Code: 18AE731	**No of Credits =03** **L-T-P::3:0:0:0 (L-T-P)**	**No. of lecture hours/week : 03**
Exam Duration: 03 Hrs.	**Max. Marks : CIE+ Asmt +GA + SEE=40+5+5+50=100**	**Total No. of Contact Hours: 39**
Pre-requisites		

Course Learning Objectives:	
1	To understand analyze Avionics System Requirements
2	To understand evolution of Flight Deck Design
3	To understand Federated and Integrated Avionics System Architectures involving MAU, LRMs and various digital Databus networks.
4	To understand s stem assessment methods
5	To understand the concept of system assessment, maintainability and reliability.

UNIT No.	**Syllabus**	**No. of hours**
1	**AVIONICS SYSTEM REQUIREMENTS & FLIGHT DECK**	**08**
	Typical Standards and Agencies in civil and Military avionics, Mission oriented Avionics System Requirements — Design Drivers, Mission Analysis Techniques, Capturing Avionics Requirements - Top Down and Bottom; Safety Requirements, Human Factors Engineering, Modelling of HFE, Flight Deck Design - Philosophy, Automation & Situational Awareness, Evolution of Cockpit Instrumentation including HVGS	
2	**DIGITAL AVIONICS DATA BUS SYSTEMS**	**08**
	Unidirectional and Bidirectional Data bus systems, Protocols, Topologies, Typical Avionics Data Buses: MIL-STD-1553B, ARINC-429, CSDB, CAN, ARINC-629, ASCB, AFDX;	
3	**AVIONICS SYSTEM ARCHITECTURES**	**08**
	Evolution of Architectures, Types of System Architectures - Centralized, Distributed, Federated and Integrated Modular Avionics Architectures, MAU, LRM, GENESIS	
4	**MATCHING AVIONICS TO AIRCRAFT**	**08**
	Standardization of Avionics Packaging- LRU, ARINC and DOD types, system cooling, EMI/EMC requirements. Aircraft powers systems: Electrical power generation & distribution systems. Civil and Military Electrical Power requirement standards, comparing the Military and Civil Requirements and Tips for Power System Design	
5	**SYSTEM ASSESSMENT MAINTAINABILITY AND RELIABILITY**	**07**
	Hardware assessment, Fault Tree Analysis (FTA), Failure Mode and Effect Analysis(FMEA), Criticality and damaging modes and effects analysis. Avionics Software Technologies, Assessment and Validation standards, Evolution of Automatic Test Equipment for maintenance, Evolution of Test Language - ATLAS; Introduction to Reliability.	

Course Outcomes:

1	To apply System requirement analysis methods for decomposition of functions among systems and sub systems
2	To build message structures using data bus concepts and to evolve conceptual avionics system architectures to evolve avionics test bench architecture
3	To appreciate importance of HFE in Flight Deck Design and automation
4	Incorporate the knowledge of matching avionics to aircraft.
5	Apply the knowledge of system assessment and reliability in avionics systems.

Text Books.	
1	RPG Collinson., **'Introduction to Avionics Systems'**, Third edition, Springer, 2013, ISBN 978-94-007-0707-8
2	Ian Moir and Allan Seabridge**., 'Civil Avionics Systems',** AIAA Education Series, 2002. ISBN: 978-1-118-34180-3.

Reference Text Books.	
1	Spitzer, C.R. 'Digital Avionics Systems- Principles and Practice', The Blackburn Press, N.J., U.S.A., 2000.
2	Len Buckwalter., 'Avionics Databuses', published by Avionics Communications,2008
3	Cary R. Spitzer, Digital Avionics Handbook, CRC Press, 2007.1SBN O -8483-8441-9

Course Outcomes Mapping with Programme Outcomes & Programme Specific Outcomes.

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	1	1	2	2	2	0	3
CO2	3	3	2	3	2	1	1	2	2	2	0	3
CO3	3	3	3	3	2	1	1	2	2	2	0	3
CO4	3	3	2	3	2	1	1	2	2	2	0	3
CO5	3	3	3	3	2	2	1	2	2	2	0	3
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

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Assessment Details both (CIE and SEE)			
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CONTINUOUS INTERNAL EVALUATION (CIE)		**Max Marks**	**Minimum Marks to be scored in CIE, to qualify to take SEE (40% individually)**
Theory	**Weightage of CIE1 and CIE2 Tests or CIE3**	**50**	**20**
	TOTAL	**50**	**20**

QUESTION PAPER PATTERN (SEE)										
Q. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
UNIT	1		2		3		4		5	
1. Two full questions (each of 20 Marks) are to be set from each unit.										
2. Student shall answer five full questions selecting one full question from each unit.										

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ADMISSION YEAR : 2020-21 ACADEMIC YEAR: 2023-24

SEMESTER : SEVENTH

Course Title	**FLIGHT TESTING**	
Sub Code: 18AE744	**No of Credits =03** **L-T-P-SS::3:0:0:0 (L-T-P)**	**No. of lecture hours/week : 03**
Exam Duration: 03 Hrs.	**Max. Marks : CIE+ Asmt +GA + SEE=40+5+5+50=100**	**Total No. of Contact Hours: 39**
Pre-requisites		

Course Learning Objectives:	
1	Comprehend the basic concepts of flight test instrumentation.
2	Acquire the knowledge of performance flight testing.
3	Acquire the knowledge of longitudinal stability and control.
4	Acquire the knowledge of lateral stability and control.
5	Understand the flying qualities.

UNIT No.	**Syllabus**	**No. of hours**
1	**INTRODUCTION TO FLIGHT TESTING**	**08**
	Introduction: Sequence, Planning and governing regulations of flight testing. Aircraft weight and center of gravity, flight testing tolerances. Method of reducing data uncertainty in flight test data -sources and magnitudes of error, avoiding and minimizing errors. **Flight test instrumentation:** Planning flight test instrumentation, Measurement of flight parameters. Onboard and ground based data acquisition system. Radio telemetry.	
2	**FLIGHT TESTING - PERFORMANCE**	**08**
	Performance flight testing - range, endurance and climb: Airspeed – in flight calibration. Level flight performance for propeller driven aircraft and for Jet aircraft - Techniques and data reduction. Estimation of range, endurance and climb performance. **Performance flight testing -take-off, landing, turning flight:** Maneuvering performance estimation. Take-offand landing -methods, procedures and data reduction.	
3	**STABILITY AND CONTROL - LONGITUDINAL AND MANEUVERING**	**08**
	Stability and control - longitudinal and maneuvering Static & dynamic longitudinal stability: - methods of flight testing and data reduction techniques. Stick free stability methods. Maneuvering stability methods & data reduction.	
4	**STABILITY AND CONTROL - LATERAL AND DIRECTIONAL**	**08**
	Stability and control - lateral and directional Lateral and directional static & dynamic stability: - Coupling between rolling and yawing moments. Steadyheading slide slip. Definition of Roll stability. Adverse yaw effects. Aileron reversal. Regulations, test techniques and method of data reduction.	
5	**FLYING QUALITIES**	**07**
	Flying qualities: MIL and FAR regulations. Cooper-Harper scale. Pilot Rating. Flight test procedures. **Hazardous flight testing:** Stall and spin- regulations, test and recovery techniques. Test techniques for flutter,vibration and buffeting.	

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Course Outcomes:	
1	Understand the basics of flight testing.
2	Evaluate the performance parameters.
3	Determine the longitudinal stability parameters.
4	Determine the lateral stability parameters.
5	Explain the flying qualities of an aircrafts.

Text Books.	
1	Flight Testing of Fixed WingAircraft, Ralph D Kimberlin, AIAA educational Series, 2003
2	Flight Testing- Conventional and Jet Propelled Airplanes, Benson Hamlin, Mac Millan, 1946.

Reference Text Books.	
1	Flight Test Manual, AGARD,
2	Small Unmanned fixed-wingAircraft Design, A.J. Keane, A.Sobester, Wiley, 2017.
3	Flight Performance of Fixedand Rotary Wing Aircraft, A. Filippone, AIAA Series, 2006.

Course Outcomes Mapping with Programme Outcomes & Programme Specific Outcomes.

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	1	1	2	2	2	0	3
CO2	3	3	2	3	2	1	1	2	2	2	0	3
CO3	3	3	3	3	2	1	1	2	2	2	0	3
CO4	3	3	2	3	2	1	1	2	2	2	0	3
CO5	3	3	3	3	2	2	1	2	2	2	0	3
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

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Department of Aeronautical Engineering

Assessment Details both (CIE and SEE)			
The weightage of Continuous Internal Evaluation (CIE) and Semester End Exam (SEE) is 50% each. The students have to obtain a minimum of 40% marks individually both in CIE and SEE to pass. Theory Semester End Exam (SEE) is conducted for 100 marks (3 Hours duration) and reduced to 50 Marks.			
CONTINUOUS INTERNAL EVALUATION (CIE)		**Max Marks**	**Minimum Marks to be scored in CIE, to qualify to take SEE (40% individually)**
Theory	**Weightage of CIE1 and CIE2 Tests or CIE3**	**50**	**20**
	TOTAL	**50**	**20**

QUESTION PAPER PATTERN (SEE)										
Q. No.	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
UNIT	1		2		3		4		5	
1. Two full questions (each of 20 Marks) are to be set from each unit.										
2. Student shall answer five full questions selecting one full question from each unit.										

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Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 ACADEMIC YEAR: 2023-24

SEMESTER : SEVENTH

Course Title	**MODELNG AND ANALYSIS LAB**	
Sub.Code:**18AEL76**	No. of Credits:**1 = 0:0:2:0** (L-T- P-S)	No. of Practical Hours/Week**:02**
Exam Duration:**03** Hrs.	**Max. Marks :** **CIE+ Asmt +GA + SEE=40+5+5+50=100**	Total No.of Contact Hours:**26**
Pre-requisites	**CFD, FEM**	

Sl No.	Details of Drawing	No. of hours	BTLs
	UNIT 1		
Part A	1. Modeling of Symmetrical/Cambered Aerofoil Geometry , and Generation of Body Fitting Adaptive Mesh. 2. Modeling of 2-D Incompressible and Invisicd Flow over Symmetrical/Cambered Aerofoil, and Plotting of Pressure distribution and Velocity vectors for Subsonic/Supersonic Mach numbers. 3. Modeling of 2-D Compressible and Viscid Flow over Symmetrical/Cambered Aerofoil, and Plotting of Pressure distribution and Velocity vectors for Subsonic Mach numbers. 4. Isentropic Flow Analysis in a 2-D Subsonic Diffuser and a Subsonic Nozzle. 5. Isentropic Flow Analysis in a 2-D Supersonic Diffuser and a Supersonic Nozzle. 6. Geometric Modeling and Mesh Generation of a 2-D Convergent-Divergent Nozzle and Analyses of flow for Adiabatic Conditions (Fanno Flow). **7.** Geometric Modeling and Mesh Generation of a 2-D Pipe and Modeling of Steady/Unsteady Heat Convection and Conduction (Rayleigh Flow).	**13**	**L1-L4**
			L1-L4
	UNIT 1I		
Part B	1. Structural Modeling of Sandwich Beam of Rectangular Cross-section 2. Unsymmetrical bending case. Structural Modeling and Stress Analysis of a Torsion Box of a Wing. 3. Structural Modeling and Stress Analysis of a Fuselage Frame. 4. Structural Modeling and Stress Analysis of a Tapered I-Section Spar. 5. Determine the Natural frequency and Mode shapes of a Cantilever beam under UDL. 6. A Plate fixed at one end has a hole in centre and has varying thickness, Determine stresses developed due to applied static loads in vertical direction. 7. A Tapered Plate fixed at one end has a hole in centre and has varying thickness, determine stresses developed due to applied static loads in vertical direction.	**13**	**L1-L4**

CONTINUOUS INTERNAL EVALUATION (CIE)

1. CIE has a maximum of 50 marks
2. CIE Marks is finalized by conducting a test at the end of 10^{th} week of the semester
3. CIE Marks (50) = Evaluation of Record (30) + Test (20)

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ADMISSION YEAR : 2020-21 ACADEMIC YEAR: 2023-24

SEMESTER : SEVENTH

Course Title	**FLIGHT SIMULATION LAB**	
Sub.Code:**18AEL77**	No. of Credits:**1 = 0:0:2:0** (L-T- P-S)	No. of Practical Hours/Week**:02**
Exam Duration:**03** Hrs.	**Max. Marks :** **CIE+ Asmt +GA + SEE=40+5+5+50=100**	Total No.of Contact Hours:**26**
Pre-requisites	**Flight dynamics, Control engineering**	

Dra No.	Details of Drawing	No. of hours	BTLs
	UNIT 1		
1	1. Draw Pole-Zero map of dynamic system model with plot customization option 2. Plot root locus with variables in transfer function through MATLAB 3. Plot root locus for a dynamic system though MATLAB 4. Draw Bode plot from a transfer function in MATLAB and explain the gain and phase margins 5. Simulate a spring- mass- damper system with and without a forcing function though SIMULINK 6. Simulate a simple servo-mechanism motion with feedback- in the time domain, and in `s` domain **7.** Simulate a bomb drop from an aircraft on a moving tank in pure pursuit motion	**13**	**L1-L4**
			L1-L4
	UNIT 1I		
2	1. Develop a straight and level flight simulation program using MATLAB 2. Simulate aircraft Take-off and Landing with trajectory tracing 3. Simulate stall of aircraft and show the effect of variation in static margin on stalling characteristics 4. Simulate aircraft longitudinal motion and demonstrate the effect of static margin variation for a pulse input in pitch that is intended to bleed the airspeed. 5. Simulate aircraft longitudinal motion and demonstrate the effect of static margin variation for a doublet input in pitch. 6. Given a Quartic characteristic equation, determine two quadratics that shall result in poles of shortperiod oscillations and poles of Phugoid. Vary the coefficients of polynomial to study the movement of poles. 7. Given a Quartic characteristics equitation, determine Poles and Time constants for Roll mode, Spiral motion, and Dutch roll. Vary the coefficients of polynomial to study the movement of poles.	**13**	**L1-L4**

CONTINUOUS INTERNAL EVALUATION (CIE)

1. CIE has a maximum of 50 marks
2. CIE Marks is finalized by conducting a test at the end of 10^{th} week of the semester
3. CIE Marks (50) = Evaluation of Record (30) + Test (20)

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ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2022-23**

SEMESTER : SEVENTH

COURSE TITLE : PROJECT WORK PHASE- I		
Sub Code: 18AEP78	**No of Credits =2** **L-T-P-SS:: 0:0:4:0**	**No. of contact hours/week : 04**
Exam Duration : 3 hours	**CIE Marks: 50**	**SEE Marks : 50**

Course objectives:

1. To provide an amicable atmosphere for students to plan
2. To test their learned theory knowledge in an actual working situation
3. To discover the value of work and relish rewards of accomplishment
4. To ensure a professional preparation to the liberal educational goals.

STAGES FOR PROJECT WORK	
Step 1	Formulation of the problem
Step 2	Exhaustive literature survey
Step 3	Methodology
Step 4	Time estimation for completing the project

The Project proposal shall be submitted within 3 weeks from the start of the semester in the prescribed standard format (04 copies) to the HOD, after the certification of the concerned guide and HOD.

Minimum number of students per batch: 02 Maximum number of students per batch: 04

CIE Evaluation: Two seminars shall be conducted at the end of 6 and 10 week of the semester.

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Literature review on par with international journal standards

CO2: Literature gap determination and definition of the problem

CO3: Scientific Design / Numerical Analysis / Analytical model and interpret them

CO4: Apply tools / techniques for problem solving and prepare project work

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	1	2	1	1	1	1	1	1	1
CO2	3	3	2	1	2	1	1	1	1	2	1	1
CO3	3	3	2	1	2	1	1	1	1	2	1	1
CO4	3	3	3	1	2	1	1	1	1	2	1	1
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

SCHEME OF EXAMINATION (CIE)

1. Departments shall constitute a Departmental Project Review Committee (internal guide + faculty) to review the project at the middle of the semester.

2. Internal guide alone shall evaluate the Project Phase I at the end of the semester for a maximum of 35 marks.

3. Project Review Committee shall evaluate the Project Phase I at the end of the semester for a maximum of 15 marks.

SCHEME OF EVALUATION (CIE)			
PARTICULARS	**Guide (MAX MARKS)**	**Project Review Committee (MAX MARKS)**	**Total Marks**
Formulation of the problem		**03**	
Relevance of the subject in the present context		**02**	
Literature Survey		**02**	
Problem formulation		**03**	
Oral presentation		**05**	
TOTAL	**35**	**15**	**50**

SCHEME OF EVALUATION (SEE)	
Sl. No.	**PARTICULARS**
1	Formulation of the problem
2	Relevance of the subject in the present context
3	Literature Survey
4	Problem formulation
5	Oral presentation

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

GUIDELINES FOR PREPARING PROJECT REPORT

1. Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on an A4 size bond paper (210 x 297 mm).
2. **The margins should be:** Left – 1.25″, Right – 1″, Top and Bottom – 0.75″.
3. The total number of reports to be prepared are
   i) A copy to the department library
   ii) A copy to the concerned guide(s)
   iii) Two copies to the sponsoring agency
   iv) Candidate's copy.
4. Before taking the final printout, the approval of the **concerned guide(s) is mandatory** with suggested corrections, if any, to be incorporated.
5. For making copies dry tone Xerox is suggested. Every copy of the report must contain Inner title page (White) Outer title page with a plastic cover Certificate in the format enclosed both from the college and the organization where the project is carried out.
6. An **abstract (synopsis)** not exceeding 100 words, indicating salient features of the work. (NB: four copies of the abstract are to be submitted to the Department on the date of submission separately)
7. The organization of the report should be as follows
   i) Inner title page
   ii) Abstract or Synopsis
   iii) Acknowledgments
   iv) Table of Contents
   v) List of table & figures (optional)
   vi) Usually numbered in roman
   vii) Chapters (to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.
   viii) The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
   ix) The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 12.
   x) The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
   xi) The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.
   xii) **Reference OR Bibliography:** The references should be numbered serially in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

   For textbooks – A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.

   For papers – Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

8. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.

$$V = IZ \text{ ……. } (3.2)$$

All equation numbers should be right justified.

9. The project report should be brief and include descriptions of work carried out by others only to the minimum extent necessary. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced. Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project
10. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix.
11. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.
12. Software projects must include a virus free disc, containing the software developed by them along with the read me file. Read me file should contain the details of the variables used, salient features of the software and procedure of using them: compiling procedure, details of the computer hardware/software requirements to run the same, etc. If the developed software uses any public domain software downloaded from some site, then the address of the site along with the module name etc. must be included on a separate sheet. It must be properly acknowledged in the acknowledgments.
13. Sponsored Projects must also satisfy the above requirements along with statement of accounts, bills for the same dully attested by the concerned guides to process further, They must also produce NOC from the concerned guide before taking the internal viva examination.
14. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.
15. Separator sheets, used if any, between chapters, should be of thin paper.

COLOUR OF THE OUTER COVER/FRONT PAGE OF UG DISSERTATION / PROJECT REPORT - SKY BLUE

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY

(An autonomous institution, Aided by Govt. of Karnataka, Affiliated to VTU)

BDA Outer Ring Road, Near Jnana Bharathi Campus, Bengaluru - 560056

Department of Aeronautical Engineering

CERTIFICATE

Certified that the project work - Phase I (Seventh Semester) entitled…… is carried out by the following bonafide students of Aeronautical Engineering in partial fulfilment for the award of Bachelor of Engineering, B. E (Aeronautical Engineering) at **Dr. Ambedkar Institute of Technology, Bangalore,** during the academic year ..... .

Sl. No	U S N (ascending order)	Name of Student

It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the project report.

The project report has been approved satisfying the academic requirements prescribed for the said Degree.

Guide	**Internal Examiner**	**HOD**

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2022-23**

SEMESTER : SEVENTH

COURSE TITLE : INDUSTRY INTERNSHIP	
Sub Code: 18AEI79	**No of Credits =00** **L-T-P-SS::0:0:2:0**

Internship: All the students admitted to III year of BE/B. Tech have to undergo mandatory internship of 4 weeks during the vacations of VI and VII semesters and /or VII and VIII semesters. If not completed after VI semester examinations, it has to be carried out during the intervening vacations of VII and VIII semesters). A University examination will be conducted during VIII semester and prescribed credit are added to VIII semester. Internship is considered as a head of passing and is considered for the award of degree. Those, who do not take-up/complete the internship will be declared as failed and have to complete during subsequent University examination after satisfy the internship requirements.

OBJECTIVE:

1. To inculcate the working procedure in the students in the industry by incorporating their knowledge gained during engineering course.

2. Exposing the student community to the real working environment in the industry.

PROCEDURE FOR INTERNSHIP:

1. Students shall approach any one of small, medium or large scale industries of their choice and get permission for carryout internship for a minimum duration of four weeks.

2. Obtain a permission/recommendation letter from the college to the respective industry to permit him/her to carry out the internship.

3. After obtaining a permission from industry, fix the time period for internship (during their intervening vacations of VII and VIII semester) after mutual discussion with the industry and the students. The same should be communicated to the department regarding the time period of internship.

4. Student should start and continue his/her internship with the assistance and guidance of the allotted authorised person to gain maximum knowledge of real time working in the industry.

5. Student should maintain a fact sheet of working (containing timings, machines, operations, softwares, programmes etc.) on day to day basis for his/her entire period of internship.

6. Obtain a signature in all the fact sheet from the authorised person under whom guidance he/she is working.

7. An internship certificate issued by that industry should be obtained and submitted to the department.

8. Immediately after completion of the internship he/she must prepare an internship report containing internship certificate and submit the report to the department for evaluation.

SCHEME OF EVALUATION (CIE): Internal evaluation will be conducted at the end of the semester by two internal faculty members nominated by the department.

SCHEME OF EVALUATION (CIE)		
DETAILS	**MAXIMUM MARKS**	**Two Internals faculty members**
Internship/ report	**30**	
Presentation	**10**	
Viva Voce	**10**	
Max Marks	**50**	

SCHEME OF EVALUATION (SEE): The viva-voce examination will be conducted by the two examiner's consisting of one internal examiner and another external examiner from industry where student undergone internship. In case, an external examiner is not available, a senior faculty member from the department can be used.

SCHEME OF EVALUATION (SEE)		
DETAILS	**MAXIMUM MARKS**	**Two examiners**
Presentation	**30**	
Viva Voce	**20**	
Max Marks	**50**	

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

GUIDELINES FOR PREPARING INTERNSHIP REPORT

1. Internship reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on an A4 size bond paper (210 x 297 mm).

2. The margins should be: Left – 1.25″, Right – 1″, Top and Bottom – 0.75″.

3. The total number of reports to be prepared are
   v) A copy to the department library
   vi) A copy to the concerned guide(s)
   vii) Two copies to the industry guide
   viii) Candidate's copy.

1. Before taking the final printout, the approval of the industry and **guide in the college is mandatory** with suggested corrections, if any, to be incorporated.
2. For making copies dry tone Xerox is suggested. Every copy of the report must contain Inner title page (White) Outer title page with a plastic cover Certificate in the format enclosed both from the college and the organization where the project is carried out.
3. An **abstract (synopsis)** not exceeding 100 words, indicating salient features of the internship work. (NB: four copies of the abstract are to be submitted to the Department on the date of submission separately)
4. The organization of the report should be as follows
   i) Inner title page
   ii) Internship completion certificate
   iii) Abstract of internship
   iv) Acknowledgment
   v) Table of Contents
   vi) List of table & figures (optional)
   vii) Usually numbered in roman
   viii) Chapters (to be numbered in Arabic) containing **Introduction**-, which usually specifies the scope of work and its importance and industrial importance, Main body of the report divided appropriately into chapters, sections and subsections.
   ix) The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
   x) The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 12.
   xi) The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
   xii) The last chapter should contain the summary of the internship work carried, contributions if any, their utility along with the scope for further work.
   xiii) **Reference OR Bibliography:** The references should be numbered serially in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

   For textbooks – A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.

5. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.

$$V = IZ \quad \ldots\ldots\ldots \quad (3.2)$$

All equation numbers should be right justified.

16. The project report should be brief and include descriptions of internship. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced.
    Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project
17. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix.
18. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.
19. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.
20. Separator sheets, used if any, between chapters, should be of thin paper

COLOUR OF THE OUTER COVER/FRONT PAGE OF UG DISSERTATION / PROJECT REPORT - SKY BLUE

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY

(An autonomous institution, Aided by Govt. of Karnataka, Affiliated to VTU)

BDA Outer Ring Road, Near Jnana Bharathi Campus, Bengaluru - 560056

Department of Aeronautical Engineering

CERTIFICATE

Certified that the industry internship (Seventh Semester) entitled…… is carried out by the following bonafide student of Aeronautical Engineering in partial fulfilment for the award of Bachelor of Engineering, B. E (Aeronautical Engineering) at **Dr. Ambedkar Institute of Technology, Bangalore,** during the academic year ..... .

U S N	Name of Student

It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the project report.

The internship report has been approved satisfying the academic requirements prescribed for the said Degree.

Guide	**Internal Examiner**	**HOD**

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2022-23**

SEMESTER : EIGHTH

COURSE TITLE : PROJECT WORK PHASE – II		
Sub Code: 18AEP81	**No of Credits : 10**	**No. of contact hours/week : 02**
Exam Duration : 3 hours	**CIE Marks: 50**	**SEE Marks : 50**

COURSE OBJECTIVES:

1. To provide an opportunity and atmosphere in which students may test theory learned in the classroom in an actual working situation and discover the value of work and the rewards of accomplishment

2. To insure a natural transition to the higher level of professional preparation as a complement to the liberal education goals of the Institution.

STAGES OF PROJECT WORK
Identification of project topic related to area of interest in the field of advanced or current Aeronautical Engineering
Literature survey based on the identified topic
Define / formulate the problem and the methodology
Design and fabricate or analysis based on type of problem
Results, conclusions, scope for further work
References.
Oral presentation of the project at the end of 6^{th} and 10^{th} week of a semester

OUTCOMES: On completion of the course, student should be able to:

CO1: Perform literature review on par with international journal standards.

CO2: Identify literature gap and define the problem.

CO3: Design experiments scientifically / perform numerical analysis / develop analytical models and interpret the results and apply advanced tools / techniques for solving the problem.

CO4: Prepare quality document of project work.

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	3	1	1	3	3	2	3	1
CO2	3	3	2	3	3	1	1	3	3	2	3	2

CO3	3	3	3	3	3	1	1	3	3	2	3	2
CO4	3	3	2	1	3	1	1	2	2	3	3	1
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

CIE EVALUATION: Two presentations shall be conducted at the end of 6th and 10th week of the semester. The Project Report shall be submitted in the prescribed standard format (04 copies) to the HOD, after the certification of the concerned guide and HOD.

SCHEME OF EVALUATION (CIE)			
PARTICULARS	**Guide (MAX MARKS)**	**Project Review Committee (MAX MARKS)**	**Total Marks**
Relevance of topic		**05**	
Oral presentation		**05**	
Viva Voce		**05**	
TOTAL	**35**	**15**	**50**

SCHEME OF EVALUATION (SEE)		
Sl. No.	**Particulars**	**Max. Marks**
1	Relevance of the subject in the present context	**05**
2	Literature Survey	**05**
3	Problem formulation	**05**
4	Experimental observation / theoretical modelling	**05**
5	Results – Presentation & Discussion	**05**
6	Conclusions and scope for future work	**05**
7	Overall presentation of the Thesis/Oral presentation	**20**
	Total Marks	**50**

GUIDELINES FOR PREPARING PROJECT REPORT

6. Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on an A4 size bond paper (210 x 297 mm).
7. **The margins should be:** Left – 1.25″, Right – 1″, Top and Bottom – 0.75″.
8. The total number of reports to be prepared are
   ix) A copy to the department library
   x) A copy to the concerned guide(s)
   xi) Two copies to the sponsoring agency
   xii) Candidate's copy.
9. Before taking the final printout, the approval of the **concerned guide(s) is mandatory** with suggested corrections, if any, to be incorporated.

10. For making copies dry tone Xerox is suggested. Every copy of the report must contain Inner title page (White) Outer title page with a plastic cover Certificate in the format enclosed both from the college and the organization where the project is carried out.
11. An **abstract (synopsis)** not exceeding 100 words, indicating salient features of the work. (NB: four copies of the abstract are to be submitted to the Department on the date of submission separately)
12. The organization of the report should be as follows
    xiv) Inner title page
    xv) Abstract or Synopsis
    xvi) Acknowledgments
    xvii) Table of Contents
    xviii) List of table & figures (optional)
    xix) Usually numbered in roman
    xx) Chapters (to be numbered in Arabic) containing Introduction-, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.
    xxi) The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
    xxii) The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 12.
    xxiii) The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
    xxiv) The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.
    xxv) **Reference OR Bibliography:** The references should be numbered serially in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.
    For textbooks – A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.
    For papers – Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

13. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g.

$$V = IZ \quad \ldots\ldots\ldots (3.2)$$

All equation numbers should be right justified.

21. The project report should be brief and include descriptions of work carried out by others only to the minimum extent necessary. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced. Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project

22. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix.
23. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.
24. Software projects must include a virus free disc, containing the software developed by them along with the read me file. Read me file should contain the details of the variables used, salient features of the software and procedure of using them: compiling procedure, details of the computer hardware/software requirements to run the same, etc. If the developed software uses any public domain software downloaded from some site, then the address of the site along with the module name etc. must be included on a separate sheet. It must be properly acknowledged in the acknowledgments.
25. Sponsored Projects must also satisfy the above requirements along with statement of accounts, bills for the same dully attested by the concerned guides to process further, They must also produce NOC from the concerned guide before taking the internal viva examination.
26. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.
27. Separator sheets, used if any, between chapters, should be of thin paper

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

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Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY

(An autonomous institution, Aided by Govt. of Karnataka, Affiliated to VTU)

BDA Outer Ring Road, Near Jnana Bharathi Campus, Bengaluru - 560056

Department of Aeronautical Engineering

CERTIFICATE

Certified that the project work - Phase II (Eighth Semester) entitled…… is carried out by the following bonafide students of Aeronautical Engineering in partial fulfilment for the award of Bachelor of Engineering, B. E (Aeronautical Engineering) at **Dr. Ambedkar Institute of Technology, Bangalore,** during the academic year ..... .

Sl. No	U S N (ascending order)	Name of Student

It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the project report.

The project report has been approved satisfying the academic requirements prescribed for the said Degree.

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

Guide	**HOD**	**Principal**

External Viva:

Sl. No	Name of the examiner	Signature with date
1		
2		

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2022-23**

SEMESTER : EIGHTH

COURSE TITLE : TECHNICAL SEMINAR		
Sub Code: 18AES82	**No of Credits : 01**	**No. of contact hours/week : 02**
Exam Duration : 3 hours	**CIE Marks: 50**	**SEE Marks : 50**

COURSE OBJECTIVES:

1. To equip students for making a technical presentation based on a thorough re-search review on any contemporary area of Engineering and Management fields

2. Offering the student an opportunity to interact with faculty and peer group and to build the ability to making independent presentation.

STAGES OF SUBJECT SEMINAR
Identification of seminar topic related to area of interest in the field of advanced Aeronautical Engineering
Literature survey on the selected topics and collection of research papers.
Final seminar shall be presented during 8 /9 week of the semester in the department before the Departmental Evaluation Committee constituted by HOD.
The seminar marks are to be awarded by the committee.
Students shall submit the seminar report in the prescribed standard format.

COURSE OUTCOMES: On completion of the course, student should be able to:

CO1: Conduct literature survey on a current topic based on peer reviewed literature and identify research gap in the literature

CO2: Develop methodologies to resolve the identified problem(s)

CO3: Develop presentation slides / report arranging the material coherently and discuss the topic with clarity and confidence.

CO4: Summarize the presentation, submit the report and identify scope for further work.

MAPPING OF COs WITH POs												
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	3	3	2	3	3	3	3	3
CO2	3	3	2	3	3	3	2	3	3	3	3	3
CO3	3	3	3	3	3	3	2	3	3	3	3	3

CO4	3	3	2	1	3	3	3	3	3	3	3	3
Strength of correlation: Strongly related-3, Moderately related-2, Weakly related-1, Not related-0												

SCHEME OF EVALUATION (CIE)			
PARTICULARS	**Guide (MAX MARKS)**	**Project Review Committee (MAX MARKS)**	**Total Marks**
Relevance of topic		**05**	
Oral presentation		**10**	
Viva Voce		**10**	
TOTAL	**25**	**25**	**50**

SCHEME OF EVALUATION (SEE)		
Sl. No.	**Particulars**	**Max. Marks**
1	Relevance of the subject in the present context	**05**
2	Literature Survey	**05**
3	Problem formulation	**05**
4	Experimental observation / theoretical modelling	**05**
5	Results – Presentation & Discussion	**05**
6	Conclusions and scope for future work	**05**
7	Overall presentation	**20**
	Total Marks	**50**

Dr Ambedkar Institute of Technology, Bengaluru-56
Department of Aeronautical Engineering

ADMISSION YEAR : 2020-21 **ACADEMIC YEAR: 2022-23**

SEMESTER : EIGHTH

COURSE TITLE : INDUSTRY INTERNSHIP		
Sub Code: 18AEI83	**No of Credits : 02**	**No. of contact hours/week : 02**
Exam Duration : 3 hours	**CIE Marks: 50**	**SEE Marks : 50**

Internship: All the students admitted to III year of BE/B. Tech have to undergo mandatory internship of 4 weeks during the vacations of VI and VII semesters and /or VII and VIII semesters. If not completed after VI semester examinations, it has to be carried out during the intervening vacations of VII and VIII semesters). A University examination will be conducted during VIII semester and prescribed credit are added to VIII semester. Internship is considered as a head of passing and is considered for the award of degree. Those, who do not take-up/complete the internship will be declared as failed and have to complete during subsequent University examination after satisfy the internship requirements.

OBJECTIVE:

1. To inculcate the working procedure in the students in the industry by incorporating their knowledge gained during engineering course.

2. Exposing the student community to the real working environment in the industry.

PROCEDURE FOR INTERNSHIP:

1. Students shall approach any one of small, medium or large scale industries of their choice and get permission for carryout internship for a minimum duration of four weeks.

2. Obtain a permission/recommendation letter from the college to the respective industry to permit him/her to carry out the internship.

3. After obtaining a permission from industry, fix the time period for internship (during their intervening vacations of VII and VIII semester) after mutual discussion with the industry and the students. The same should be communicated to the department regarding the time period of internship.

4. Student should start and continue his/her internship with the assistance and guidance of the allotted authorised person to gain maximum knowledge of real time working in the industry.

5. Student should maintain a fact sheet of working (containing timings, machines, operations, softwares, programmes etc.) on day to day basis for his/her entire period of internship.

6. Obtain a signature in all the fact sheet from the authorised person under whom guidance he/she is working.

7. An internship certificate issued by that industry should be obtained and submitted to the department.

8. Immediately after completion of the internship he/she must prepare an internship report containing internship certificate and submit the report to the department for evaluation.

SCHEME OF EVALUATION (CIE): Internal evaluation will be conducted at the end of the semester by two internal faculty members nominated by the department.

SCHEME OF EVALUATION (CIE)		
DETAILS	**MAXIMUM MARKS**	**Two Internals faculty members**
Internship/ report	**30**	
Presentation	**10**	
Viva Voce	**10**	
Max Marks	**50**	

SCHEME OF EVALUATION (SEE): The viva-voce examination will be conducted by the two examiner's consisting of one internal examiner and another external examiner from industry where student undergone internship. In case, an external examiner is not available, a senior faculty member from the department can be used.

SCHEME OF EVALUATION (SEE)		
DETAILS	**MAXIMUM MARKS**	**Two examiners**
Presentation	**30**	
Viva Voce	**20**	
Max Marks	**50**	