



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with "A" Grade by NAAC

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119.

Phone: 044 - 2450 3150 / 51 / 52 / 54 / 55 Fax: 044 - 2450 2344

www.sathyabama.ac.in



SAEX1024	Wind Tunnel Techniques	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I PRINCIPLES OF MODEL TESTING

10 hrs.

Buckingham Theorem – Non Dimensional Numbers – Scale Effect of Similarities.

UNIT II WIND TUNNELS

10 hrs.

Classification – Special Problems of Testing in Subsonic, Transonic, Supersonic and Hypersonic Speed Regions – Layouts – Sizing and Design Parameters.

UNIT III CALIBRATION OF WIND TUNNELS

10 hrs.

Test Section Speed – Horizontal Buoyancy – Flow Angularities – Turbulence Measurements – Associated Instrumentation – Calibration of Supersonic Tunnels.

UNIT IV WIND TUNNEL MEASUREMENTS

10 hrs.

Pressure and Velocity Measurements - Force Measurements – Three Component and Six Component Balances
– Internal Balances.

UNIT V FLOW VISUALIZATION

10 hrs.

Smoke and Tuft Grid Techniques – Dye Injection Special Techniques – Optical Methods of Flow Visualization.

(Computational problems must be given as assignments for each unit)

REFERENCE BOOKS:

1. Pope, A., and Goin, L., "High Speed Wind Tunnel Testing", John Wiley, 1985.
2. Rae, W.H., and Pope, A., "Low Speed Wind Tunnel Testing", John Wiley Publication, 1984.



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SAEX 1029	AIR TRANSPORT AND AIRCRAFT MAINTENANCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION

10hrs

Development of air transportation, comparison with other modes of transport – Role of IATA, ICAO – The general aviation industry, airline – Factors affecting general aviation, use of aircraft, airport: airline management and organisation – levels of management, functions of management, Principles of organizations, planning the organisation – chart, support departments & line departments.

UNIT II AIRLINE ECONOMICS

10 hrs.

Forecasting – Fleet size, Fleet planning, fleet commonality, factors affecting choice of fuels, aircraft evaluation, the aircraft selection process, operating cost, passenger capacity, load factor etc. – Passenger fare and tariffs – Influence of geographical, economic & political factors on routes, route selection and capital acquisition.

Valuation & Depreciation – Budgeting, Cost planning – Aircrew evaluation – Route analysis

UNIT III PRINCIPLES OF AIRLINES SCHEDULING

10 hrs.

Equipment maintenance, Flight operations and crew scheduling, Ground operations and facility limitations, equipments and types of schedule – hub & spoke scheduling, advantages / disadvantages & preparing flight plans – Aircraft scheduling in line with aircraft maintenance practices.

UNIT IV AIRCRAFT RELIABILITY

10 hrs.

Aircraft reliability and alert level determination – The maintenance schedule & its determinations – hardtime, On condition, Condition monitoring maintenance– Extended range operations (EROPS) & ETOPS – Ageing aircraft maintenance production.

UNIT V TECHNOLOGY IN AIRCRAFT MAINTENANCE

10 hrs.

Airlines scheduling (with reference to engineering) – Product support and spares – Maintenance sharing – Equipments and tools for aircraft maintenance – Aircraft weight control – Budgetary control. On board maintenance systems – Engine monitoring – Turbine engine oil maintenance –Turbine engine vibration monitoring in aircraft – Life usage monitoring – Current capabilities of NDT – Helicopter maintenance – Future of aircraft maintenance.

TEXT BOOKS

1. Fedric J.H., "Airport Management", 2000.
2. C.H. Friend, "Aircraft Maintenance Management", 2000.



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SAEX1032	Aircraft Maintenance Management	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I AIRLINE ECONOMICS AND MAINTENANCE COST 10 hrs.

Airline economics and the aircraft – Principles of airlines economics – Cost of aircraft maintenance.

UNIT II SCHEDULES AND CONSTRAINTS 10 hrs.

Aircraft reliability –The maintenance schedules and its determinations–hardtime, on condition, conditions monitored maintenance – Extended range operations (EROPS) & ETOPS – Ageing aircraft. Maintenance, corrosion prevention programme

UNIT III MAINTENANCE PRODUCTION 10 hrs.

Airline scheduling (with reference to engineering) – Product support and spares – Maintenance sharing – Equipments and tools for aircraft maintenance – Aircraft weight control – Budgetary control, man power allocation.

UNIT IV COMPUTER IN AIRCRAFT MAINTENANCE 10 hrs.

Computer in aircraft maintenance – Artificial intelligence – Aircraft maintenance software's.

UNIT V TECHNOLOGY IN AIRCRAFT MAINTENANCE 10 hrs.

On board maintenance system – engine monitoring – Turbine engine oil maintenance – Turbine engine vibration monitoring in aircraft – life usage monitoring – current capabilities of NDT – Helicopter maintenance – Future of aircraft maintenance, aircraft loadable softwares- navigation data system, TCAS, EGPWS, EICAS.

TEXT BOOKS

1. C.H. Friend, Aircraft Maintenance Management, Longman, 1993
2. K.C.Batra, Production Managemen, Stringer, UK, 2005
3. Richardson J.D., Essential of Airlines Management Kendral Hunt, 1995
4. Banfe Charles F., Airline Management, Englewood Cliffs, N J – Prentice Hall 1992



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SAEX 1040	ROBOTICS ENGINEERING	L	T	P	Credits	Total Marks
		3	0	0	3	100

UNIT I INTRODUCTION TO ROBOTICS

10 hrs.

Basic concepts - Robot anatomy - Manipulators - kinematics: Forward and reverse kinematics - Precision movement, robot specifications and Work volume, Types of Robot drives - Basic robot motions - Point to point control, continuous path control.

UNIT II END EFFECTORS AND CONTROL SYSTEMS

10 hrs.

End effectors - classification - mechanical, magnetic, vacuum and adhesive gripper - gripper force analysis and design. Robot control - unit control system concept - servo and non-servo control of robot joints, adaptive and optimal control.

UNIT III SENSORS

10 hrs.

Sensor devices, Types of sensors - contact, position and displacement sensors, Force and torque sensors - Proximity and range sensors - acoustic sensors - Robot vision systems - Sensing and digitizing - Image processing and analysis.

UNIT IV ROBOT PROGRAMMING

10 hrs.

Robot language classification - programming methods - off and on line programming - Lead through method - Teach pendent method - VAL systems and language, simple program.

UNIT V APPLICATIONS

10 hrs.

Application of robots - Material handling - Machine loading and unloading, Assembly, Inspection, Welding, Spray painting, Mobile robot - Recent developments in robotics- safety considerations- Application in Aeronautical Engineering.

(Computational problems must be given as assignments for each unit)

TEXT BOOKS:

1. Deb, S. R., Robotics Technology And Flexible Automation, Tata McGraw Hill Co, New Delhi, 1994
2. Mikell P. Groover, Industrial Robotics Technology Programming And Applications, McGraw Hill Co., Singapore, 1995