

Scheme of Instruction, Examinations and Syllabus relating to

B. Engineering (Aircraft Engineering)
(Twinning Programme offered by Andhra University
in collaboration with Perth College, UK)
(with effect from 2008-2009)

B. Engineering (Aircraft Engineering) - First year – I Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE111	English(Communication Skills)	5	-	30	70
BSAE112	Mathematics	5	-	30	70
BSAE113	Physics	5	-	30	70
BSAE114	Engineering Graphics	2	3	30	70
BSAE115	Basic Work-shop Skills	-	3	50	50
BSAE116	Auto CAD	-	3	50	50

B. Engineering (Aircraft Engineering) - First year – II Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE121	Basic Electrical & Electronics	5	-	30	70
BSAE122	Aerodynamics	5	-	30	70
BSAE123	Aircraft Materials	5	-	30	70
BSAE124	Aircraft Propulsion	5	-	30	70
BSAE125	Advanced Work-shop Skills	-	3	50	50
BSAE126	Basic Electrical & Electronics Lab.	-	3	50	50

B. Engineering (Aircraft Engineering) - Second year – I Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE211	Aircraft Structures	5	-	30	70
BSAE212	Flight Controls	5	-	30	70
BSAE213	Aircraft Automatic Flight & Landing Systems	5	-	30	70
BSAE214	Aviation Legislation	5	-	30	70
BSAE215	Aircraft Inspection & Repair	-	3	50	50
BSAE216	Practical Aircraft Skills	-	3	50	50

B. Engineering (Aircraft Engineering) - Second year – II Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE221	Aircraft Engineering	5	-	30	70
BSAE222	Aircraft Propellers	5	-	30	70
BSAE223	Aircraft Gas Turbine Engines	5	-	30	70
BSAE224	Flight Controls	5	-	30	70
BSAE225	Data Processing, Transmission and Computer control systems	5	-	30	70
BSAE226	Aircraft Propulsion Systems	-	3	50	50

B. Engineering (Aircraft Engineering) - Third year – I Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE311	Aircraft Hydraulic & Pneumatic Systems	5	-	30	70
BSAE312	Modern Aircraft Technology	5	-	30	70
BSAE313	Aircraft Electrical Power Systems	5	-	30	70
BSAE314	Aircraft Landing Gear	5	-	30	70
BSAE315	Aircraft Maintenance Skills	-	3	50	50
BSAE316	Aircraft Inspection, Fault Detection and Diagnosis	-	3	50	50

B. Engineering (Aircraft Engineering) - Third year – II Semester

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE321	Aircraft Environmental Systems	5	-	30	70
BSAE322	Integrated System Analysis	5	-	30	70
BSAE323	Aircraft Servo Control Systems	5	-	30	70
BSAE324	Human Factors for Aircraft Engineering	5	-	30	70
BSAE325	Engineering Reliability & Reliability centered Aircraft Maintenance	5	-	30	70
BSAE326	Aircraft Electrical Power Systems	-	3	50	50

B. Engineering (Aircraft Engineering) - Fourth year – I & II Semesters

Sub. code	Subject title	Periods/week		Ses. marks	Exam. marks
		Theory	Practical		
BSAE411	Aircraft Engineering Project	Both semesters		200	400

**B. Engineering (Aircraft Engineering)
First Year -I Semester**

BSAE111 English (Communication Skills)

Periods / week: 5 Th.

Ses.:30 Exam 70

Examination (Theory): 3 Hrs.

1. A TEXT WITH FOCUS ON SKILLS APPROACH

Intended to develop the language skills of Listening, Speaking, Reading and Writing.

2. VOCABULARY :

1. One word Substitutes
2. Synonyms and Antonyms
3. Common Errors
4. Idioms and Phrases
5. Foreign Phrases

3. Writing skills :

1. Précis writing
2. Letter writing.
3. Report Writing.
4. E-Mail etiquette.
5. Resume Writing.

Text Book Prescribed :

1. In order to improve the proficiency of the student in the acquisition of the above mentioned skills, the following text is prescribed.
- **LEARNING ENGLISH** : A Communicative Approach, Hyderabad: Orient Long man. (selected lessons)

The following lessons are prescribed from the above Text:

- I. Astronomy (1)
- II. Humour (4)
- III. Environment (6)
- IV. Inspiration (7)

Reference Books Prescribed :

1. Sharma, G.V.L.N., *English for Engineering Students*.
2. Margaret M Maison, *Examine your English*, Orient Longman
3. Krishnaswami, N and Sriraman, T., *Current English for Colleges*, Macmillan.
5. Rizvi, M Ashraf. *Effective Technical Communication*. McGraw – Hill.

BSAE112 Mathematics

Periods / week: 5 Th.

Ses.:30 Exam 70

Examination (Theory): 3 Hrs.

Partial Differentiation and its applications:

Functions of Two or More Variables, Partial Derivatives, Homogeneous Functions- Euler's Theorem, Total Derivative. Differentiation of Implicit Functions, Geometrical Interpretation- Tangent Plane and Normal to a surface. Change of Variables, Jacobians, Taylor's Theorem for functions of two variables. Jacobians, Taylor's Theorem for functions of two variables. Errors and approximations. Total Differential, Maxima and Minima of functions two variables. Lagrange's method of undetermined multiples, Differentiation under the integral sign – Leibnitz Rule. Involutes and evolutes.

Multiple integrals and their applications:

Double integrals. Change of order of integration. Double integrals in Polar Co-ordinates, Areas enclosed by plane curves. Triple integrals. Volume of solids. Change of variables. Area of a curve of a curved surface. Calculation of Mass, Center of gravity, Center of pressure, Moment of inertia. Product of inertia. Principle Axes. Beta function, Gamma function. Relation between Beta and Gamma functions. Error function or Probability integral.

Differential Equations Of First Order And Its Applications:

Formation of differential equation. Solution of a differential equation. Geometrical meaning. Equations the first order and first degree. Variables separable, Homogeneous equations. Linear equations. Bernoulli's equation. Exact equations. Equation reducible to exact equations. Equations of the first order and higher degree. Calirut's equation. Geometric applications. Orthogonal trajectories, Physical applications. Simple Electric circuits. Heat flow, Chemical applications. Newton's law of cooling.

Vector Calculus:

Differentiation of vectors; Curves in space; Velocity and acceleration; Relative velocity and acceleration; Scalar and vector point functions; Vector operator ∇ . ∇ applied to scalar point functions; Gradient; ∇ applied to vector point functions; Divergence and Curl. Physical interpretations of $\nabla \cdot F$ and $\nabla \times F$ applied twice to point functions; ∇ applied to products of point functions; Integration of vectors; Line integral; Circulation; Work; Surface integral- Flux; Green's theorem in the plane; Stake's theorem; Volume integral; Divergence theorem; Irrotational and Solenoidal fields; Green's theorem; Introduction to orthogonal curvilinear coordinates: Cylindrical; Spherical and polar coordinates.

BSAE113 Physics

Periods / week: 5 Th.

Ses.:30 Exam 70

Examination (Theory): 3 Hrs.

Thermodynamics

Heat and Work, First law of thermodynamics and applications, Reversible and Irreversible process, Carnot cycle and Efficiency, Second law of thermodynamics, Carnot's Theorem, Entropy, Entropy and disorder, Entropy and Probability, Third law of thermodynamics.

Electromagnetism

Concept of electric flux, Gauss law- some applications, Coulomb's law from Gauss law, electric potential and field strength, potential due to a point charge and dipole.

Magnetic field – magnetic force on current, torque on current loop, Hall effect, Ampere's law, B near a long wire, B for a solenoid. The Biot-Savart's Law. B for a circular Current loop.

Faraday's law of induction. Lenz's law, Calculation of Inductance. L-R Circuit. Induced magnetic fields, Displacement current. L-R Circuit.
Maxwells equations (qualitative treatment).

Optics

Interference – Principles of superposition – Young's Experiment – Coherence – Interference of thin films, Wedge shaped film, Newtons Rings, Michelson Interferometer and its applications.

Diffraction – Single slit (Qualitative and quantitative treatment).

Polarisation – Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization and detection.

Lasers and Fibre Optics and Nano Technology

Spontaneous and stimulated emissions, population inversions, Ruby laser, Gas laser, Semiconductor laser, Applications of lasers.

Structure of Optical Fibre , Total Internal Reflection, Acceptance Angle and cone of a fibre, Numerical aperture, types of Optical Fibres, Fibre optics in communications and its advantages.

Nanotechnology (Basic Concepts only) and its Applications.

Books Recommended

- 1) Engineering Physics by R.K. Gaur and S.D. Gupta
- 2) Physics by David Halliday and Robert Resnick – Part I and Part II
- 3) Engineering Physics By M.N. Avadhanulu & P.G.Kshirsagar.(S.Chand)

Reference Books:

- 1) Physics for Engineers – M.R.Srinivasan
- 2) Engineering Physics – M.Armugam
- 3) Modern Engineering Physics by A.S. Vadudeva

BSAE114 Engineering Graphics

Periods / week: 2 Th., Pr. 3

Ses.:30 Exam 70

Examination (Theory): 3 Hrs.

Introduction:

Drawing Instruments and uses. Lettering scales in common use.

Curves:

Curves used in Engineering Practice, conic sections, construction of conics by different methods, rectangular-hyperbola, cycloidal curves, epi and hypo-cycloids. Involute and Archimedian spiral.

Projections of Points and Straight Lines:

Projection of points, projection of straight lines,

Projections of Planes:

Projection of planes and projection on auxiliary planes.

Projections Solids and Developments:

Projection of solids in simple positions, projection of solids with axis inclined to one of the reference planes and parallel to the other, projection of solids with axis inclined to both the reference planes.

Sections and Developments:

Sections of different solids and true shape of sections. Development of surfaces of solids. Development of transition piece connecting a square and circular pipe.

Intersections:

Intersection of surfaces-simple problems with prisms and cylinders

Isometric Projections:

Isometric projections, and conversion of orthographic projection into isometric projection.

Textbook:

1. Elements of Engineering Drawing by N.D. Bhatt

Reference:

1. Engineering Graphics by K.L. Narayana and P. Kannaiah.

BSAE115 Basic Work- shop Skills

Periods / week: Pr. 3

Ses.:50 Exam :50

Examination (Practical): 3 Hrs.

1. Carpentry – Three jobs
2. Fitting – Three jobs
3. Tin Smithy – Three jobs
4. Welding – Three jobs
5. Use of Power Tools – Two jobs

BSAE116 AutoCAD

Periods / week: Pr. 3

Ses.:50 Exam :50

Examination (Practical): 3 Hrs.

1. Basic AutoCAD commands
2. Dimensioning
3. 2D Examples
4. Conversion from 2D to 3 D

BSAE 125 Advanced Work- shop Skills**II Semester:**

1. Lathe
 - a. Plain and Step turning
 - b. Taper turning, Grooving and Knurling
 - c. Right and Left hand threading
2. Shaper:
 - a. Hexagon shaping
 - b. Key ways (Different Types)
3. Drilling: Drilling, Reaming and Tapping
4. Milling: Spur Gear
5. Grinding: Surface Grinding and Centre less Grinding
6. Moulding: Two Jobs
7. Forging: Two Jobs