

PAE7J005 HELICOPTER Engineering 3-0-0

UNIT I

ELEMENTS OF HELICOPTER AERODYNAMICS

Configurations based on Torque reaction – Jet rotors and compound helicopters – Methods of Control, rotor blade pitch control, –Collective pitch and and Cyclic pitch – Lead – Lag and flapping hinges

UNIT II

IDEAL ROTOR THEORY

Hovering performance – Momentum and simple blade element theories – Figure of merit – Profile and induced power estimation – Constant Chord and ideal twist rotors.

UNIT III

POWER ESTIMATES

Induced, profile and parasite power requirements in forward flight – Performance curves with effects of altitude – Preliminary ideas on helicopter stability.

UNIT V

LIFT, PROPULSION AND CONTROL OF V/STOL AIRCRAFT

Various configurations – propeller, rotor, ducted fan and jet lift – Tilt wing and vectored thrust –Performance of VTOL and STOL aircraft in hover, transition and forward motion.

GROUND EFFECT MACHINES

Types – Hover height, lift augmentation and power calculations for plenum chamber and peripheral jet machines – Drag of hovercraft on land and water –Applications of hovercraft.

TEXT BOOKS

1. Gessow, A. and Myers, G. C., Aerodynamics of Helicopter, MacMillan & Co., 1987.
2. Gupta, L., Helicopter Engineering, Himalayan Books, 1996.

REFERENCES

1. Johnson, W., Helicopter Theory, Princeton University Press, 1980.
2. MacCromick, B. W., Aerodynamics of V/STOL Flight, Academic Press, 1987.