

PAPER V: COMPUTER APPLICATIONS IN ENVIRONMENTAL SCIENCES

Part - A: Theory: 60 Marks (45 UE + CIA)

UNIT 1:

Introduction to computers: Computer system - Hardware components - CPU, Memory, I/O devices, information storage media; software components; Computer Programmes - Stored programme concept, operating systems - DOS and its use; Algorithm - flow charts and pseudo - code.

UNIT 2:

Functions and sub programmes: Statements of functions - function subprogramme - subroutine subprogram - common statements - Equivalence statements.

File Management: I/O statement for sequential access file. I/O statements for direct access file. Auxiliary I/O statements, file positioning I/O statements namelist statements.

UNIT 3:

Study of scientific packages such as Fox pro, C language, Microsoft office - MS Excel - spreadsheets/worksheets & graphing features to model simple systems and their graphical presentations.

UNIT 4:

Programming exercise to handle problems of numerical types. Numerical methods: matrix operations, inversion eigen, symmetric and real symmetric matrices, interpolation and extrapolation; smoothing of curves, best square fit.

UNIT 5:

Programming exercise to handle problems of statistical types. Statistical techniques: Probability, discrete and continuous distributions, estimation of parameters; hypothesis testing; ANOVA; linear / polynomial regression and correlation; elements of multivariate analysis: Principal components / factors; clustering; multiple/partial correlations; MANOVA discriminant factors. Forecasting & simulation for simple environmental modeling.

PART-B: PRACTICAL 40 MARKS (30UE + 10 CIA)

REFERENCES

1. D.E. Agrankright: 'Mathematical Application of Electronic Spreadsheets' (McGraw Hill, 1985).
2. E.V. Krishnamurthy and S.K. Sen: 'Computer - Based Numerical Algorithm', East West Press, 1984.
3. G.B. Davis and T.R. Hoffmann: 'FORTRAN 77' (McGraw-Hill, 1986)
4. S. Jabi & J. Kowalik: 'Mathematical modelling with computers' (Prentice Hall, 1985)
5. Manuals of work processor, dBase & Lotus.
6. K.S. Trivedi, 'Probability and Statistics with Reliability, queuing & Computer Science Applications' Prentice Hall, India.
7. S.C. Gupta & V.U. Kapoor, 'Fundamentals of Mathematics Statistics'.