

**CORE COURSE IV  
PTERIDOPHYTES, GYMNOSPERMS & PALEOBOTANY**

**Unit I**

Pteridophytes -general characteristics and classification by Smith, morphology, structure, Reproduction and life-histories of the following genera:- Psilotum, Lycopodium, Selaginella and Equisetum.

**Unit II**

Adiantum, Marsilea, Stelar evolution in Pteridophytes. Heterospory and origin of seed habit.

**Unit III**

Gymnosperms- general characteristics and classification of Gymnosperms by Sporne, Morphology, structure and mode of reproduction and life- histories of the following:- Cycas, Pinus and Gnetum.

**Unit - IV**

Paleobotany- fossils and methods of fossilization- Geological time-scale-an elementary knowledge of the computation of the age of fossils-Radio-Carbon dating.

**Unit - V**

A brief study of the following fossil forms:- Rhynia, Lepidodendron, Lepidocarpon, Calamites & Williamsonia.

**REFERENCES**

**PTERIDOPHYTES**

- Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups)  
McGraw Hill, N.Y.
- Parihar, N.S. (19 ) : An Introduction to Embryophyta Vol.II Pteridophyta  
Central Book Depot., Allahabad.
- Smith, G.M. (1955) : Cryptogamic Botany Vol.II (2<sup>nd</sup> Edn.)  
(Bryophytes & Pteridophytes)  
Tata McGraw Hill Publishing Co., New Delhi,
- Sporne, K.R. (1970) : The Morphology of Pteridophytes  
(The Structure of Ferns and Allied Plants)  
Hutchinson University Library, London
- Bierhorst, D.W. (1971) : Morphology of Vascular Plants  
The MacMillan Co., N.Y. & Collier-MacMillan  
Ltd., London, ,
- Sharma, O.P. (1990) : Textbook of Pteridophyta

- MacMillan India Ltd., Delhi, Madras, Patna, Jaipur, Vapi,  
Bangalore, Hyderabad, Lucknow, Trivandrum, Guwahati,  
Coimbatore, Cuttack, Bhopal-
- Sundara Rajan, S. (1994) : Introduction to Pteridophyta  
New Age International Publishers Ltd., Wiley Eastern  
Ltd., New Delhi, Bangalore, Bombay, Calcutta, Guwahati,  
Hyderabad, Lucknow, Madras, Pune, London
- Vashista, P.C. (1997) : Botany for Degree Students-Pteridophyta.  
S. Chand & Co., New Delhi,
- Rashhed, A. (1999) : An Introduction to Pteridophyta  
Vikas publishing Co., New Delhi,

## **GYMNOSPERMS**

- Coulter, J.M. &  
C.J. Chamberlain (1964) : Morphology of Gymnosperms  
Central Book Depot, Allahabad
- Sporne, K.R. (1971) : The Morphology of Gymnosperms  
(The Structure and Evolution of Primitive seed Plants)  
Hutchinson University Library, London
- Datta, S.C. (1984) : An Introduction to Gymnosperms  
Kalyani Publishers, New Delhi, Ludhiana
- Chopra, G.W., &  
Verma, Y. (1988) : Gymnosperms  
Pradeep Publications, Jalandhar,
- Vashista, P.C. (1996) : Botany for Degree Students-Gymnosperms(2<sup>nd</sup> Edn.)  
S. Chand & Co., New Delhi,
- Sharma, O.P. (1997) : Gymnosperms  
Pragati Prakashan, Meerut, India
- Bhatnagar, S.P. &  
Alok Moitra (1997) : Gymnosperms  
New Age International (P)Ltd., Publisher, New Delhi,  
Bangalore, Calcutta, Chennai, Guwahati, Hyderabad,  
Lucknow, Mumbai, Pune
- Strivastava, H.N. (1998) : Gymnosperms  
Pradeep Publications, Jalandhar, India

## **PALEOBOTANY**

- Arnold, C.A. (1947) : An Introduction to Paleobotany  
McGraw Hill Book Co., N.Y.,
- Seward, A.C. (1959) : Plant Life Through the Ages  
Hafner Publishing Co., N.Y.
- Scott, D.H. (1962) : Studies in Fossil Botany (Vol.I & Vol.II)  
Hafner Publishing Co., N.Y.
- Delavoryas, T. (1962) : Morphology and Evolution of Fossil Plants  
Holt, Rinehart & Winston, N.Y. Chicago, San  
Francisco, Toronto, London

- Shukla, A.C. & Misra, S.P. (1975) : Essentials of Paleobotany  
Vikas Publishing House (P)Ltd., Delhi, Bombay, Kanpur
- Stewart, W.N. (1983) : Paleobotany & the Evolution of Plants  
Cambridge University Press, Cambridge, London, N.Y.,  
New Rochelle, Melbourne, Sydney
- Venkatachala, B.S., Shukla, M. & Sharma, M. (1992) : Plant Fossils-a Link with the Past  
(A Birbal Sahni Birth Centenary Tribute)  
Birbal Sahni Institute of Paleobotany, Lucknow, India

### **Practical :**

A study of the Morphology and anatomy of both vegetative and reproductive parts of the living genera and fossil forms of the following Genera.

### **PTERIDOPHYTES**

- |               |                                     |
|---------------|-------------------------------------|
| Psilotum -    | Demonstration only                  |
| Lycopodium    | Stem and Cone only                  |
| Selaginella - | “                                   |
| Equisetum -   | Stem, cone slide Demonstration only |
| Adiantum -    | Rachis, Sorus                       |
| Marsilea -    | Stem, Sporocarp slides              |

### **GYMNOSPERMS**

- |          |                                                                                                      |
|----------|------------------------------------------------------------------------------------------------------|
| Cycas -  | Rachis, Leaflet – TS; Coralloid root, male cone microsporophyll, Megasporephyll – Demonstration only |
| Pinus -  | Needle –TS, Young stem – TS; Male & Female cone – Demonstration only                                 |
| Gnetum - | Stem –TS , Male & Female Strobilus – Demonstration only                                              |

### **PALEOBOTANY**

Rhynia, Lepidodendron, Lepidocarpon, Calamites (Slides), Williamsonia