



**Integral University, Lucknow**  
**Integral Institute of Agricultural Science and Technology**  
**Evaluation Scheme of Post Graduate Program**  
**w.e.f. 2020-21**

**M. Sc. (Ag.) Horticulture**

**Semester-I**

| Course Code   | Course Title  | Type of Course                     | Periods/ Per week |   |   | Evaluation Scheme Theory Mid Sem |    |       | Evaluation Scheme Practical Mid Sem |    |       | Practical End Sem Exam | Sub Total (Theory + Practical Mid Sem Exam) | End Sem Theory Exam | Subject Total | Credit | Total Credit Points | Attributes    |                  |                   |                 |                              |             |                     |   |   |
|---|---|------------------------------------|-------------------|---|---|----------------------------------|----|-------|-------------------------------------|----|-------|------------------------|---|---------------------|---------------|--------|---------------------|---------------|------------------|-------------------|-----------------|------------------------------|-------------|---------------------|---|---|
|   |   |                                    | L                 | T | P | CT                               | TA | Total | CT                                  | TA | Total |                        |   |                     |               |        |                     | Employability | Entrepreneurship | Skill Development | Gender Equality | Environment & Sustainability | Human Value | Professional Ethics |   |   |
| HT501   | Principles of Fruit Production                          | Core courses (Compulsory)          | 2                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 2:0:1  | 3                   | √             |                  | √                 |                 |                              |             |                     | √ |   |
| HT502   | Fruit Plant Propagation and Nursery Management          |                                    | 2                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 2:0:1  | 3                   | √             | √                | √                 |                 |                              |             |                     |   | √ |
| <b>Total</b>  |   |                                    |                   |   |   |                                  |    |       |                                     |    |       |                        |   |                     |               |        | <b>06</b>           |               |                  |                   |                 |                              |             |                     |   |   |
| HT503   | Fundamentals of Processing of Fruit and Vegetables      | Optional Courses                   | 1                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 1:0:1  | 2                   | √             | √                | √                 |                 |                              |             |                     |   | √ |
| <b>Total</b>  |   |                                    |                   |   |   |                                  |    |       |                                     |    |       |                        |   |                     |               |        | <b>09*</b>          |               |                  |                   |                 |                              |             |                     |   |   |
| <b>*Major Course (Core course + Optional course) should not exceed more than 9 credit</b> |   |                                    |                   |   |   |                                  |    |       |                                     |    |       |                        |   |                     |               |        |                     |               |                  |                   |                 |                              |             |                     |   |   |
| MT519   | Experimental Designs                                    | Minor/ Related/ Supporting courses | 2                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 2:0:1  | 3                   | √             |                  | √                 |                 |                              |             |                     |   |   |
| AG509   | Production Technology of Cool Season Vegetable Crops    |                                    | 2                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 2:0:1  | 3                   |               |                  |                   |                 |                              |             |                     |   |   |
| AG505   | Production Technology of Underexploited Vegetable Crops |                                    | 2                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 2:0:1  | 3                   |               |                  |                   |                 |                              |             |                     |   |   |
| <b>Total</b>  |   |                                    |                   |   |   |                                  |    |       |                                     |    |       |                        |   |                     |               |        | <b>**</b>           |               |                  |                   |                 |                              |             |                     |   |   |
| PGS503 (e-Course)   | Intellectual Property and Its Management in Agriculture | Non Credit Course (Compulsory)     | 1                 | 0 | 0 | 20                               | 10 | 30    | -                                   | -  | -     | 0                      | 0   | 70                  | 100           | 1:0:0  | 1 <sup>#</sup>      | √             | √                | √                 |                 |                              |             |                     |   | √ |
| PGS504  | Basic Concepts in Laboratory Techniques                 |                                    | 0                 | 0 | 2 | 0                                | 0  | 0     | -                                   | 25 | 25    | 75                     | 25  | -                   | 100           | 0:0:1  | 1 <sup>#</sup>      | √             | √                | √                 |                 |                              |             |                     |   |   |
| PGS507  | e-Agriculture   |                                    | 1                 | 0 | 2 | 20                               | 10 | 30    | -                                   | -  | -     | 20                     | 50  | 50                  | 100           | 1:0:1  | 2 <sup>#</sup>      |               |                  | √                 |                 |                              |             |                     |   |   |
| <b>Grand Total</b>  |   |                                    |                   |   |   |                                  |    |       |                                     |    |       |                        |   |                     |               |        | <b>***</b>          |               |                  |                   |                 |                              |             |                     |   |   |

*Grand Total (\*\*\*) = \*+\*\*, credit should not exceed more than 18 credit in one semester; #Non-Gradial Course*

**M.Sc. (Ag.) Horticulture**  
**SEMESTER-I**  
**Course Title: Principles of Fruit Production**  
**Course Code: HT501**  
**w.e.f. Session 2020-21**

**3(2+1)**

**Unit I**

Importance of fruit production. Soil and climate in relation to fruit production. Water requirement, uptake, movement and influence on root distribution, response of plants to varying soil moisture regimes, pathological conditions associated with excess and deficiencies in soil moisture; irrigation methods.

**Unit II**

Soil management methods and techniques of moisture conservation. Temperature relations, winter injury and hardiness. Light relations- thermal, photosynthetic and phototropic influences. Plant nutrients, absorption, role, deficiencies and surpluses, application of fertilizers.

**Unit III**

Phases of plant growth- initiation of reproductive processes and fruiting habits. Systems of planting, high density orcharding and inter and cover cropping in fruit production. Concepts in Hi-tech horticulture. Pruning and training methods, season and physiology. Flowering physiology and factors involved in fruit-set, unfruitfulness, fruit-growth and development.

**Unit IV**

Important physiological disorders and their management. Alternate bearing – causes and remedies. Maturity indices, harvesting, packing, transport and marketing systems of major fruit and plantation crops.

**Practical:** Study of soil characters in relation to growing of fruits and plantation crops. Soil moisture determination. Root distribution pattern of major crops. Systems of irrigation. Methods and placement of plant nutrients. Methods of pruning and training adopted in different crops. Floral biology, fruit-set, fruit-growth and fruit drop. Studies on maturity indices and techniques of harvesting. Physiological disorders of major fruit and plantation crops. Survey of local fruit markets to study grading, packing and marketing of different crops.

**Suggested Readings:**

1. Singh, J. 2014 (4<sup>th</sup> Rev.). Basic Horticulture. Kalyani Publishers
2. Singh, A. & Kumar, A. 2014. Fruit Production Technology. Pointer Publishers
3. Bose, T.K., Mitra, S.K. & Sanyal, D. (Eds.). 2002. Fruits of India – Tropical and Sub-tropical. 3rd Ed. Vols. I, II. Naya Udyog.
4. Chadha, K.L. & Pareek, O.P. 1996. (Eds.). Advances in Horticulture. Vol. I. Malhotra Publ. House.
5. Peter, K.V. 2008. (Ed.) Basics of Horticulture. New India Publ. Agency.
6. Singh H.P., Negi, J.P. & Samuel J.C. (Eds.). 2002. Approaches for Sustainable Development of Horticulture. National Horticultural Board.

**M.Sc. (Ag.) Horticulture**  
**SEMESTER-I**  
**Course Title: Fruit Plant Propagation and Nursery Management**  
**Course Code: HT502**  
**w.e.f. Session 2020-21**

**3(2+1)**

**Unit I**

Principles of plant propagation, sexual and asexual methods of propagation. Anatomical and physiological aspects of propagation through cottage, layerage and graftage; role of callus in propagation through cuttage and graftage. Etiolation and physiology of root formation and graft union.

**Unit II**

Role of rootstock in propagation. Physiology of dwarfing rootstock and dwarf rootstock of important fruit trees. Role of plant growth regulators in raising of seedlings and rooting of cuttings and layers. Role of nucellar embryony, apomixes and tissue culture.

**Unit III**

Techniques of cutting, layering, budding, grafting and micro grafting (STG). Planning of a nursery unit. Raising of nursery plants and their after care. Selection, certification and maintenance of mother plants and budwood nurseries.

**Unit IV**

Use of modern propagation structures like mist chambers, low cost polyhouse, low tunnels and study of bottom heat techniques. Media/soil mixture, containers and soil sterilization. Lifting, packing transportation and marketing of nursery plants. Economics of raising nursery of fruit and plantation crops and Nursery Acts.

**Practical:** Media/soil mixture, containers and soil sterilization. Use of chemicals for seed treatment and sowing. Preparation of nursery beds, poly bags, seed pans thumb-pots for raising seedlings. Raising of seedlings. Stratification and scarification of seeds and use of tetrazolium salts for germination tests. Identification of nucellar seedlings. Practice of different asexual methods of propagation viz., cutting, layering, budding, approach, veneer and softwood grafting. Use of plant growth regulators in propagation of plant materials. Use of mist chambers, modern propagation structures, low cost poly houses, low tunnels and bottom heat techniques. Selection, lifting, packing, transportation and marketing of nursery plants. Economics of raising nurseries. Visit to local commercial/private nurseries.

**Suggested Readings:**

1. Rajan S & Baby LM. 2007. Propagation of Horticultural Crops. New India Publ. Agency.
2. Radha T & Mathew L. 2007. Fruit Crops. New India Publ. Agency.
3. Hartmann HT & Kester DE. 1989. Plant Propagation – Principles and Practices. Prentice Hall of India.
4. Bose T.K, Mitra SK & Sadhu MK. 1991. Propagation of Tropical and Subtropical Horticultural Crops. Naya Prokash.
5. Peter KV. (Ed.). 2008. Basics of Horticulture. New India Publ. Agency.
6. Singh SP. 1989 Mist Propagation. Metropolitan Book Co.

**M.Sc. (Ag.) Horticulture  
SEMESTER-I**

**Course Title: Fundamentals of Processing of Fruit and Vegetables**

**Course Code: APH515**

**w.e.f. Session 2020-21**

**2 (1+1)**

**Unit-I**

Importance of processing in Horticulture development. History of preservation. Nutritive value of processed fruits and vegetables.

**Unit-II**

Role of micro-organics, enzymes and water activity in preservation, principles and methods of preservation by heat, chemicals, drying, radiation, freezing and fermentation. Modern methods of drying and dehydration. Drying equipment. Intermediate moisture foods.

**Unit-III**

Role of fermentation for different fermented products. Methods of preparation of confectionery and tomato products. Canning of fruits and vegetables. Preserving of fruit juices, beverages and concentrates. Fundamentals of freezing of fruits and vegetables.

**Unit-IV**

Packaging and storage of processed fruit and vegetable products. Management of different processes wastes. Food processing and nutrition. Importance of hygiene and sanitation. Food laws. Hazard analysis and critical control points (HACCP), TQM, GMP, Investment analysis.

**Practical:** Blanching and its effect on enzymes. Preparation of different products as per food laws and regulations. Extraction of pectin and its evaluation. Dehydration, canning, freezing, chemical preservation and fermentation. Evaluation of food nutrients. Visit to fruit and vegetable processing plants. HACCP.

**Suggested Readings:**

1. Ahmad, M.S. & Siddiqui, M.W. 2015. Post Harvest Quality Assurance of Fruits. Springer International Publishing AG Switzerland
2. Nanda, V. & Sharma, S. 2017. Novel Food Processing Technologies. New India Publishing Agency.
3. Bhutani RC. 2003. Fruit and Vegetable Preservation. Biotech Books.
4. Chadha KL & Pareek OP. (Eds.). 1996 Advances in Horticulture. Vol. IV. Malhotra Publ. House.
5. Haid NF & Salunkhe SK. 1997. *Post Harvest Physiology and Handling of Fruits and Vegetables*. Grenada Publ.
6. Mitra SK. 1997. *Post Harvest Physiology and Storage of Tropical and Sub-tropical Fruits*. CABI.
7. Ranganna S. 1997. *Hand Book of Analysis and Quality Control for Fruit and Vegetable Products*. Tata McGraw-Hill.

**M.Sc. (Ag.)**  
**SEMESTER-I**  
**Course Title: Experimental Designs**  
**Course Code: MT519**  
**w.e.f. Session 2018-19**

**3(2+1)**

**Unit-I**

Experiments: Absolute Experiments, Comparative experiments, need for designing of experiments, characteristics of a good design. Treatment, experimental unit, blocks, yield, uniformity trials, size and shape of plots and blocks. Principles of design of experiment: randomization, replication and local control.

**Unit-II**

Designs of experiments: Completely Randomized Design, Randomized Block Design and Latin square design and their analysis of variance. factorial design; symmetrical and asymmetrical. Confounding in symmetrical factorial experiments, factorial experiments with control treatment, advantages and disadvantages of confounding.

**Unit-III**

Analysis of covariance for two-way classification (Randomized Block Design). Split plot design: comparison between split-plot design and factorial design, advantages and disadvantages of split plot design. Missing Plot techniques: Analysis of missing plot design (Fisher's Rule), analysis of Randomized Block Design with one missing observation, analysis of Latin Square Design with one missing observation

**Unit-IV**

Balanced Incomplete Block Design (BIBD), parameters of BIBD, Incidence matrix, Symmetric BIBD, Analysis of BIBD, efficiency of BIBD relative to Randomized Block Design, Response Surfaces.

**Practical**

Uniformity trial data analysis, formation of plots and blocks, Analysis of data obtained from Completely Randomized Design, Randomized Block Design, Latin Square Design; Analysis of factorial experiments without and with confounding; Analysis with missing data; Split plot designs; Transformation of data; Fitting of response surfaces.

**Suggested Readings:**

1. Montgomery, D. C. (2008): Design and Analysis of Experiments, John Wiley.
2. Casella, G, (2008). Statistical Design. Springer.
3. Goon, A.M., Gupta, M.K. and Dasgupta, B. (2005): Fundamentals of Statistics. Vol. II, 8thEdn. World Press, Kolkata.
4. Cochran, W.G. and Cox, G.M. (1959): Experimental Design. Asia Publishing House.
5. Kempthorne, O. (1965): The Design and Analysis of Experiments. John Wiley.
6. Gupta, S.C. and Kapoor, V.K. Fundamentals of Applied Statistics.

**M.Sc. (Ag.) Horticulture  
SEMESTER-I**

**Course Title: Production Technology of Cool Season Vegetable Crops**

**Course Code: AG509**

**w.e.f. Session 2020-21**

**3(2+1)**

**Theory**

Introduction, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures and seed production of:

**Unit I**

Potato

**Unit II**

Cole crops: cabbage, cauliflower, knoll kohlrabi, sprouting broccoli, Brussels sprout

**Unit III**

Root crops: carrot, radish, turnip and beetroot

**Unit IV**

Bulb crops: onion and garlic

**Unit V**

Peas and broad bean, green leafy cool season vegetables

**Practical**

Cultural operations (fertilizer application, sowing, mulching, irrigation, weed control) of winter vegetable crops and their economics; Experiments to demonstrate the role of mineral elements, plant growth substances and herbicides; study of physiological disorders; preparation of cropping scheme for commercial farms; visit to commercial greenhouse/ polyhouse.

**Suggested Readings**

1. Bose TK & Som MG. (Eds.). 1986. Vegetable Crops in India. Naya Prokash.
2. Bose TK, Som G & Kabir J. (Eds.). 2002. Vegetable Crops. Naya Prokash.
3. Bose TK, Som MG & Kabir J. (Eds.). 1993. Vegetable Crops. Naya Prokash.
4. Bose TK, Kabir J, Maity TK, Parthasarathy VA & Som MG. 2003. Vegetable Crops. Volume: I-III. Naya Udyog.
5. Chadha KL & Kallou G. (Eds.). 1993-94. Advances in Horticulture Vols. V-X. Malhotra Publ. House.
6. Chadha KL. (Ed.). 2002. Hand Book of Horticulture. ICAR.
7. Chauhan DVS. (Ed.). 1986. Vegetable Production in India. Ram Prasad & Sons.
8. Decoteau DR. 2000. Vegetable Crops. Prentice Hall.
9. Edmond JB, Musser AM & Andrews FS. 1951. Fundamentals of Horticulture. Blakiston Co.
10. Fageria MS, Choudhary BR & Dhaka RS. 2000. Vegetable Crops: Production Technology. Vol. II. Kalyani.
11. Gopalakrishnan TR. 2007. Vegetable Crops. New India Publ. Agency.
12. Hazra P & Som MG. (Eds.). 1999. Technology for Vegetable Production and Improvement. Naya Prokash.
13. Rana MK. 2008. Olericulture in India. Kalyani Publication.
14. Rana MK. 2008. Scientific Cultivation of Vegetables. Kalyani Publication.
15. Rubatzky VE & Yamaguchi M. (Eds.). 1997. World Vegetables: Principles, Production and Nutritive Values. Chapman & Hall.
16. Saini GS. 2001. A Text Book of Olericulture and Floriculture. Aman Publ. House.

17. Salunkhe DK & Kadam SS. (Ed.). 1998. Hand Book of Vegetable Science and Technology: Production, Composition, Storage and Processing. Marcel Dekker.
18. Shanmugavelu KG. 1989. Production Technology of Vegetable Crops. Oxford & IBH.
19. Singh DK. 2007. Modern Vegetable Varieties and Production Technology. International Book Distributing Co.
20. Singh SP. (Ed.). 1989. Production Technology of Vegetable Crops. Agril. Comm. Res. Centre.
21. Thamburaj S & Singh N. (Eds.). 2004. Vegetables, Tuber Crops and Spices. ICAR.
22. Thompson HC & Kelly WC. (Eds.). 1978. Vegetable Crops. Tata McGraw-Hill.

**M.Sc. (Ag.) Horticulture  
SEMESTER-I**

**Course Title: Production Technology of Underexploited Vegetable Crops**

**Course Code: AG505**

**w.e.f. Session 2018-19**

**3(2+1)**

**Theory**

Introduction, botany and taxonomy, climatic and soil requirements, commercial varieties/hybrids, sowing/planting times and methods, seed rate and seed treatment, nutritional and irrigation requirements, intercultural operations, weed control, mulching, physiological disorders, harvesting, post-harvest management, plant protection measures and seed production of:

**Unit I**

Asparagus, artichoke and leek

**Unit II**

Brussels's sprout, Chinese cabbage, broccoli, kale and artichoke.

**Unit III**

Amaranth, celery, parsley, parsnip, lettuce, rhubarb, spinach, basella, bathu (chenopods) and chekurmanis.

**Unit IV**

Elephant foot yam, lima bean, winged bean, vegetable pigeon pea, jack bean and sword bean.

**Unit V**

Sweet gourd, spine gourd, pointed gourd, Oriental pickling melon and little gourd (kundru).

**Practical**

Identification of seeds; botanical description of plants; layout and planting; cultural practices; short-term experiments of underexploited vegetables.

**Suggested Readings**

1. Bhat KL. 2001. Minor Vegetables - Untapped Potential. Kalyani.
2. Indira P & Peter KV. 1984. Unexploited Tropical Vegetables. Kerala Agricultural University, Kerala.
3. Peter KV. (Ed.). 2007-08. Underutilized and Underexploited Horticultural Crops. Vols. I-IV. New India Publ. Agency.
4. Rubatzky VE & Yamaguchi M. (Eds.). 1997. World Vegetables: Principles, Production and Nutritive Values. Chapman & Hall.



**M.Sc. (Ag.)/MBA Agribusiness Management**  
**SEMESTER-I**  
**Course Title: Intellectual Property and Its Management in Agriculture**  
**Course Code: PGS503**  
**w.e.f. Session 2018-19**

**1(1+0)**

**Unit-I**

Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs;

**Unit-II**

Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks,

**Unit-III**

Protection of plant varieties and farmers' rights and bio-diversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture;

**Unit-IV**

Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

**Suggested Readings**

1. Chandan Roi (2018). The Role of Intellectual Property Rights in Agriculture and Allied Sciences CRC Press.
2. Neeraj Pandey and Kushdeep Dharni. Intellectual Property Rights PHI Learning Pvt Limited.
3. Erbisch FH & Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI.
4. Download e-course free from: <http://hau.ac.in/HRM/pdf/ecourse503.pdf>

**M.Sc. (Ag.)/MBA Agribusiness Management**  
**SEMESTER-I**  
**Course Title: Basic Concepts in Laboratory Techniques**  
**Course Code: PGS504**  
**w.e.f. Session 2018-19**

**1(0+1)**

**Practical**

Safety measures while in Lab; Handling of chemical substances; Use of burettes, pipettes, measuring cylinders, flasks, separatory funnel, condensers, micropipettes and vascupets; washing, drying and sterilization of glassware; Drying of solvents/chemicals. Weighing and preparation of solutions of different strengths and their dilution; Handling techniques of solutions; Preparation of different agro-chemical doses in field and pot applications; Preparation of solutions of acids; Neutralization of acid and bases; Preparation of buffers of different strengths and pH values. Use and handling of microscope, laminar flow, vacuum pumps, viscometer, thermometer, magnetic stirrer, micro-ovens, incubators, sandbath, waterbath, oilbath; Electric wiring and earthing. Preparation of media and methods of sterilization; Seed viability testing, testing of pollen viability; Tissue culture of crop plants; Description of flowering plants in botanical terms in relation to taxonomy

**Suggested Readings**

1. Furr AK. 2000. CRC Hand Book of Laboratory Safety. CRC Press.
2. Gabb MH & Latchem WE. 1968. A Handbook of Laboratory Solutions. Chemical Publ. Co.

## M.Sc. (Ag.)/MBA Agribusiness Management

### SEMESTER-I

Course Title: e-Agriculture

Course Code: PGS507

w.e.f. Session 2018-19

2(1+1)

#### UNIT-I

Introduction and Applications of e-Agriculture, Introduction to Online Agricultural resources: Consortium for e-resources in Agriculture (CeRA), e-agriculture community, Agriculture: National Portal of India. Agricultural Datasets and Databases: Agricola, Agris. Need of Biological databases in Agricultural Sciences

#### UNIT-II

ICAR- Centre for Agricultural Bioinformatics (CABin): Mandates and Thrust areas; National Agricultural Bioinformatics Grid (NABG): ASHOKA - Advanced Supercomputing Hub for OMICS Knowledge in Agriculture: features and applications; National Bio-Computing Portal: objectives, facilities provided at NBCP.

#### UNIT-III

Education – Meaning, Definition, Types – Formal Informal and Non-formal education and their Characteristics. Individual contact methods – Meaning, Objectives, Steps. Group contact methods, Mass contact Methods and Innovative Information sources, Method of training.

#### UNIT-IV

Agricultural Journalism – Meaning, Scope and Importance, Sources of news, Types of training, RRA, PRA tools and techniques KVK, Adopter categories, MANAGE, EEI: extension education institute.

**Practicals:** Usage of Biological database and tools, Briefing about retrieval of scientific articles from PubMed database and NAL Online Catalog – AGRICOLA, PRA tools and techniques, Introduction of Geospatial Technology for generating valuable information for Agriculture, Research priorities at NABG, Softwares and Tools available at NABG, Link to available Database resources at NABG and its implications.

#### Suggested Readings:

1. Agri Informatics: An Introduction (Industry Series), by R Chakravarthy, ICFAI University Press
2. E-Agriculture: Concepts and Applications (Agriculture Series), Rahul Gupta (Author), ICFAI University Press
3. Introduction to Bioinformatics by Teresa Attwood, David Parry-Smith 1st edition; Prentice Hall Publications
4. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins by Andreas D. Baxevanis and B. F. Francis Ouellette (Eds), 2nd Edition; Willey & Sons Publications.
5. Bioinformatics: Sequence, Structure, and Databanks: A Practical Approach by Des Higgins, Willie Taylor; OUP.
6. BIOS Instant Notes in Bioinformatics by Charlie Hodgman, Andrew French, David Westhead, Taylor & Francis publishing; 2 edition.