

Open Elective

MBE-509: Microbial Techniques

40h

Unit I

12h

Isolation techniques of microorganisms: Isolation of pure cultures; dilution, spread plate, streak plate, pour plate, micromanipulator method, colony morphology and other characteristics of cultures. Maintenance and preservation of pure cultures, culture collection center-national and international. Direct microscopic count, standard plate count, membrane filtration.

Unit II

14h

Microscopy- Principles and Applications of Bright field and Dark field Microscopy. Fluorescent Microscopy, Phase contrast Microscopy, Confocal Microscopy. Electron Microscope-Principles and Applications of Transmission Electron Microscope, Scanning Electron Microscope, Sample preparation for Electron Microscopy.

Unit III

14h

Centrifugation- Basic principles of sedimentation, Types of centrifugation and their Applications, Rotors, Ultracentrifugation. Principle and applications of spectrophotometer-UV/visible, fluorescence. Electrophoresis, SDS-PAGE, Isoelectric focusing, 2D gel Electrophoresis, PFGE. Principles and applications of Chromatography.

MBE-510: Pharmacology & Pharmacognosy

40 h

Unit I

12h

Medicinal and aromatic plants, A brief account on Phytochemical and Pharmacological aspects and uses of medicinal plants. Study of biosynthetic pathway of Atropine, Morphine Cardiac glycosides, Terpenes and Flavonoids. Definition of Functional foods and Nutraceuticals. Classification, Medicinal uses and health benefits of Nutraceuticals / Functional foods - Spirulina, Soya bean, Garlic, Turmeric, Tea and Coffee, Carotenoids, α and β Carotene, Lycopene, Xanthophyll and Flavonoids. Vegetable Bitters: Definition; bitter principles, actions and therapeutics.

Unit II

14h

HERBAL EXTRACTS: Types of extracts; Extraction methods such as Maceration, Percolation, supercritical fluid extraction, Distillation Methods; Methods for drying of extracts. Solvent extractions, Ointment bases, Suppository bases and Hardening agents: Lanolin, Beeswax, Cocoa Butter, Hard paraffin, Petroleum jelly. Flavours and Perfumers: Cardamom oil, Vanilla, Lemon oil, Orange oil, Sandal wood oil. Natural sweeteners: Definition of Nutritive and Non-nutritive sweeteners with examples, sweetness potency. Herbal drugs industry, International Scenario, Cultivation of medicinal and aromatic plants. Patent laws, proposed amendments as applicable to herbal/natural products and processes; drafting and filing a patent.

Unit III

14h

Herbal Cosmetics: General method of preparation and evaluation of Herbal Cosmetics such as Skin care products. A brief account of Herb extracts or Herbal products of cosmetic importance such as Aloe vera, Neem, Henna, Acacia concinna pods, Citrus aurantium peel, Liquorice, Sandal wood, Olive oil, Wheat germ oil, Almond oil. Herbal products intended for treatment of GIT, CVS, Respiratory systems, CNS. Examples of Disorders of a) GIT – Diabetes, Liver, Constipation, Diarrhoea, Dysentery. B) CVS – Hypertension, Angina c) RS – Bronchitis, Asthma, Tussive d) CNS – Pain, Fever, Anxiety Convulsion e) Musculo – Skeletal – Rheumatism, Cramps, f) Skin – Leucoderma g) GUS-Oedema, Urinary calculus, Leucorrhoea Dysmenorrhoea. Industrial and Research aspects of Pharmacognosy. A brief account of some of the technologies developed by different research institutes and companies of both national and international status like CIMAP, RRL, CDRI, NBRI, CSIR. National centre for development of natural products (NCDNP).

REFERENCES:

- Basic Plant Pathological Methods, Onkar. D. Dhingua, James. B. Sinchair, Lewis Publisher, London, 2nd edition
- Basic Techniques in Molecular Biology, Stefan Surzycki, Springer
- Bio- informatics and Human Genome, Dr.Archana mishra, Authors Press Botanical
- Bio organic Chemistry, Ashok Kumur, Sharma, Random Publication, New Delhi
- Biochemical engineering fundamentals, James E Bailey, David F Ollis, MC Graw-Hill international 2nd edition
- Biochemistry and molecular biology, Keith Wilson John Walker, Cambridge university press.
- Biochemistry and molecular biology, William H Elliot, Daphni C Elliot, Oxford university 2nd edition
- Biochemistry of Biomolecules, Dr. Ashok Kumar Sharma, Random Publications, New Delhi
- Biochemistry of nutrition, Dr Ashok kumar Sharma, Random publications, New delhi.
- Biochemistry of nutrition, Dr Ashok kumar Sharma, Random publications , New delhi.
- Biodiversity and mangroves, A B Chawdri, Daya publishing house Delhi
- Biodiversity of microbial life, James T Staley, Anna Louis, Reysenbach, Evilly- Liss Publication
- Biodiversity, CEE, oxford university
- Bioethics, Ben Mephan, Oxford university press 2nd edition
- Bioethics, Nancy. S. Jecker, Albert. R. Johnson, Robert. A. Pearlman, Johnson and Bartlett Publishers, Boston, 2nd edition
- Biofertilizers in agriculture and forestry, N. S Subha Rao, Oxford & IBH publishing Co pvt. Ltd. New Delhi
- Bioinformatics Computing, Brayan Bergeron, Prentice- Hall of India, Pvt. Ltd. New Delhi
- Bioinformatics, Andreas D Baxevanis, B F Francis Ourlette, Wile intex science Singapore 2nd edition
- Biological centrifugation, J Grahan, The Bios publication
- Biological control: Benefits and Risks, Heikki M.T, Hokkamann, James M lyneh, Cambridge university press.
- Biological Pest Control, T.V. Sathe, P. M. Bheje, Daya Publishing House, Delhi
- Biological safety, Diane O Fleming, Debra C Hunt, ASM Press Washington 3rd Edition
- Biologically based technologies for pest control, Roger C herdman, scientific publishers [India
- Biophysics (2), Vatsala Piramal, Dominant Publishers and distributors, New Delhi
- Biophysics an introduction, Rodney cotteril, John Wiley and sons LTD.
- Biotechnological application of microbes, Ajith Verma, Gopi. K. Podila, I. K. International Pvt. Ltd. New Delhi
- Biotechnology , A Krishnan, Agrobios 2nd edition
- Biotechnology and other alternative technologies, Amalendn Chakraverty, Oxford KIBH Publishing Co. Pvt. Ltd. New Delhi
- Biotechnology of Plants and Microorganisms, O. J. Gocomo, W. R. Sharp, D. A. Evans, J. E. Bravo, F. C. A. Tavors, E. F. Paddock, Ohio State University Press, Columbus
- Biotechnology, H.J.Rehin, G. Reed, with A. Puhler, P. Stadler, volume 1.
- Biotechnology, H. J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 11c.
- Biotechnology, H. J. Rehma, G. Reed with A. Puhler. P. stadler, Weinheim, Newyork Basel, Cambridge, Totiyo, 2nd edition.
- Biotechnology, H.J. Rehin, G. Reed with A. Puhler, P. stadler, Wiley- VCH weinheim- Newyork volume 8a.
- Biotechnology, H.J Rehin, G. Reed, with A. Puhler, P. Stadler, volume 2.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 4.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 10.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 6.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 8b.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 11b.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 3.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, 2nd edition.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 5b.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. Stadler, volume 7.
- Biotechnology, H.J. Rehin, G. Reed, with A. Puhler, P. stadler, volume 11a.
- Biotechnology, John. E. Smith, Cambridge University Press, 3rd edition
- Biotechnology, Pamela petters, Wm. C. Brown Publishers

- Biotechnology: Food Fermentation (2), V. K. Joshi, Ashok Pandey, Educational Publishers & distributors, New Delhi, Volume- 1
- Biotechnology, s. s Puohit, S. K Mathur, Agro Botanical Publisher
- Cell and Molecular Biology, E. D. P De Robertis, E. M. F De Robertis Jr, B. I. Waverly Pvt. Ltd. Janpath, New Delhi, 8th edition
- Cell proliferation and apoptosis, O.Hughes AND H.Mechnet, Bios scientific publishers.
- Cellular and Molecular Immunology, Abul K. Abbas, Andrew H. Lichtman Saunders An Imprint of Elsevier, Philadelphia, 5th edition
- Cellular microbiology, Pascale cassart, Patrice Boquet, Staffan Normark and Rino Rippuoli, ASM press, Washington 2nd edition.
- Cellular microbiology, Pascale Cossat, Patrice Boquet, Staffan Nomark, Rino Rappoli, ASM Press Washington D C.
- Chemical and Biological methods for Water Purification Studies, R. K. Trivedy, P. K. Goel, Environmental Publication
- Chemical Microbiology, Anthony H. Rose, Plenum Press- New York, 3rd edition
- Chemistry of Organic Natural Products, O. P. Agarwal, Goel Publishing House, Meerut, Volume 7
- Concepts in biotechnology, D Balasubramanian, CFA Bryce, K Dharmalingam, J Green, Kunthala , Jayaraman. Costed- IBN University press.
- DNA arrays technologies and experimental strategies, Elena V Grigorenko CRC Press Boca Ranton London.
- DNA structure and function (2), Richard R Sinden, Academic press an imprint of Elsevier
- DNA technology the awesome skill, I Edward Alcano, WCB, WM C. Brown Publishers, Chicago.
- Encyclopedic dictionary of bioethics, S.K. Ghosh, volume 2 F-M.
- Encyclopedic dictionary of bioethics, S.K. Ghoshi, Global vision publishing house 19A/E. GTB. Endave Delhi.
- Fish biotechnology, Dr M M Ranga , Dr (Msc) J Shammi, Agrobias(INDIA) Jodhpur.
- Functional analysis of bacterial genes A practical manual, Wdfgang Schanam S Dusko enrlich Newtake ogasawara, John wiley and sons Ltd, Chichester newyork.
- Fundamentals of Dairy Chemistry, Webb Johnson and Alford, C B S Publishers and distributors, Delhi 2nd edition.
- Guide to Protein Purification [2], Richard R. Burgers, Murray P. Deutscher, AP, Elsevier New York, Delhi, 2nd Edition.
- Human micro biology, Simon p Hardy, Taylor and Francis London New York.
- Illustrated fungi of North India. With special reference to J & K State, V. R. Pandotra, International Bank distributors Dehra Dun.
- Industrial Enzymes- Structure, Function and application, Julio Polaina, Andrew. P. Maccabe, Springer.
- Industrial Enzymes- Structure, Function and application, Julio Polaina, Andrew. P. Maccabe, Springer.
- Introduction to Medical Microbiology, R. Anantha. Narayan, Orient Longman ltd. Hyderabad, 2nd edition.
- Microbial physiology and metabolism, Daniel R. Caldwell, Wmc Brown publishers England.
- Microbial Physiology, Albert. G. Moat, John. W. Foster, Michael .p. Spector, Wiley- Liss , 4th Edition.
- Molecular Biology and Biotechnology, H.D. Kumar, Vitas publishing House. (p) Ltd, 2nd Edition.
- Molecular biology and Biotechnology, Robert. A. Meyere, VCH Publishers.
- Molecular Biology, Alan. S. Gerstein, Wiley-liss, AJohn Wiley and sons Inc. Publication. New York.
- Molecular Biology, Alan. S. Gerstein, Wiley-liss, AJohn Wiley and sons Inc. Publication. New York.
- Molecular Biotechnology, Bernad R. Glick and Jack..J. Pasternak, ASM press, Washington DC, 2nd Edition.
- Practical Medical Microbiology, J.G.Celleelit.G Prazier, B.P. Marmion IA. Sinmion.
- Practical skills oin biomolecule sciences, Robreed, David Holmes, Jenathan weyers and Allan Johns, longman.
- Princiles and applications of soli microbiology, David M. Sylvia, Jeffry J.Fuhrmann, Peter G.Hartel David, A. Suberer, Prentice hall.
- Principle and practice of bioanalysis, Richard .F.Venn, Taylor and francil, London & New York.
- Principle of Biochemistry .T.N.Pattabiraman, Gajanana book publishers and distribution Bangalore.
- Protein expression, S.J.Higgins and .D. Hams, the practical approach series.
- The Nature and Properties of Soil, Nyle. Brandy , Ray.R. Well, Pearson Prontice Hall. 13th edition.
- The physiology of fungal nutriron, D H Jennings, Cambridge university press.
 - Understanding DNA and Gene cloning, Karl Drlica, John Wiley & sons, Inc. New York. 3rd edition