



**DEPARTMENT OF BIORESOURCES
SCHOOL OF BIOLOGICAL SCIENCES
UNIVERSITY OF KASHMIR, SRINAGAR**

**BACHELOR OF SCIENCE
5th SEMESTER
DISCIPLINE SPECIFIC ELECTIVE COURSE – 1A (DSE)
OPTION - I**

BRS521D1A: BIORESOURCES: BIOINDUSTRIES

CREDITS: THEORY: 4; TUTORIAL: 2
MAX MARKS: THEORY: 60; TUTORIAL: 30
MIN MARKS: THEORY: 24; TUTORIAL: 12

THEORY (Lectures: 60)

Unit: I (15 Lecture)

Introduction to Bioindustry: Bioindustry— Concept and recent trends in the development of Bioindustry; Scope and status of bioindustries in India (Dairy, Sheep, Floriculture); Scope and status of Bioindustries in J &K (Dairy, Sheep, Aquaculture, Horticulture and Sericulture).

Unit: II (15 Lecture)

Bio-based waste management: Composting, vermicompositing- methods, materials and advantages; Pulping (mechanical and chemical pulping); Municipal wastes-segregation and uses; Bio-based plastics and fibres; Biomass as energy source, Biogas production, Bio-fuels- Concept and classification.

Unit: III (15 Lecture)

Bioindustry and Entrepreneurship: Entrepreneurship, Small Scale Industries, Self-employment schemes in relation to bioindustries; Status and scope and of establishing bio-based small scale industries (Cosmetics, Fertilizers, Leather, aquaculture, Ornamental horticulture and Herbal Medicine); Concept of Green entrepreneurship.

Unit: IV (15 Lecture)

Bioindustries and Green economy: Marketing strategies for Bioresources products- Product launching, evaluation and advertisements, value addition; Intellectual property rights (Patents, Copy Rights, & Trademarks); Concept of Bio-villages and biotechnological parks.



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Practical Work: 2 Credits

- Demonstration of vermicompost preparation.
- Demonstration of Developing Small Scale Biogas plant.
- Designing of fish pond for carp culture.
- Collection of data about rosaceous fruit production in J and K.
- Visit to a low temperature fruit storage facility.
- Visit to EDI (for introduction to self-employment schemes)
- Market survey for biobased cosmetics

Suggested Readings:

- Entrepreneurship: New Venture Creation, David H. Holt
- Entrepreneurship and Small Business Management: C.B. Gupta, S.S. Khanka, Sultan Chand & Sons.
- Sathe, T.V. 2004 Vermiculture and Organic Farming. Daya publishers.
- Vayas, S.C, Vayas, S. and Modi, H.A. 1998 Bio-fertilizers and organic Farming Akta Prakashan, Nadiad
- N.S. Gopalakrishnan & T.G. Agitha, (2009) Principles of Intellectual Property. Eastern Book Company, Lucknow.
- Entrepreneurial Development by S.S. Khanka (S.Chand)
- Watal J. 2001. Intellectual property rights in the WTO and developing countries. Oxford University Press. Oxford.



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BACHELOR OF SCIENCE
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DISCIPLINE SPECIFIC ELECTIVE COURSE – 1B (DSE)
OPTION - II

BRS521D1B: BIORESOURCES: BIOMEDICINE AND BIOCOSMETICS

CREDITS: THEORY: 4; PRACTICAL: 2

MAX MARKS: THEORY: 60; PRACTICAL: 30

MIN MARKS: THEORY: 24; PRACTICAL: 12

THEORY (Lectures: 60)

Unit: I

(15 Lecture)

Biomedicine: Concept of AYUSH; Development of important traditional systems of medicine (Ayurvedic and Unani); Concept of health and disease, principles of prevention and treatment of disease and health care in traditional systems of medicine (Amchi, Ayurvedic and Unani); leach therapy, maggot therapy, apitherapy.

Unit: II

(15 Lecture)

Herbal medicines: Classification, collection and processing of herbal crude drug; Plant drug standardization; Quality control and quality assurance of herbal drugs; Causes for the decline and the current revival of interest in indigenous systems of medicine; Scientific validation of herbal medicine.

Unit: III

(14 Lecture)

Bio-cosmetics: Fundamentals of biocosmetics, classification of biocosmetics, A brief study of raw materials used for biocosmetic preparations (animals, plant and marine substances); Stability of biocosmetics- Shelf-life, effects of environmental factors (light, temperatures etc) on product stability; Quality control, Packaging, labelling and storage.

Unit: III

(16 Lecture)

Types of cosmetics: Advantages of bio-cosmetic over synthetics; Personal hygiene products (shaving creams, tooth pastes); Hair Care Products (Conditioners, Setting lotion, Hair creams and dyes); Skin Care Products (moisturizers, sunscreen products, acne products, anti-ageing creams); Perfumes (types of essential oils).



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Practical Work: 2 Credits

- Qualitative test for secondary metabolites (Alkaloids, Saponins, terpenes, tannins, glycosides, phenols)
- Ethno-medicinal Survey & documentations.
- Identification of crude drugs containing Alkaloids by morphological characters.
- Determination of ash value of different powdered crude drugs.
- Determination of Antifungal activities of different powdered crude drugs.
- Quantitative estimation of resin & sugars.
- Study of Morphological & Microscopic characters of Herbs used in Skincare.
- Application of various methods for extraction, solvent systems & isolation of active constituents.
- Study of various oils used in Aromatherapy with special reference to its applications.

Suggested Readings

- Hand Book on Ayurvedic Medicines, H. Panda National Institute of Industrial Research, Delhi-7
- Indian Herbal Pharmacopoeia vol. I & II Indian Drug Manufacturer's association, Mumbai
- Alternative medicine, by Dr. K.B. Nangia.
- Perfumes, Cosmetics and Soaps by Poucher.
- Cosmetic Science and Technology Vol I, II, III by Sagarin.
- Hand Book of herbal products Vol I & II by NIIR Board of Technologist
- Cosmetics Analysis selective methods with techniques by P. Bare.
- Bannerman, R.H., Burton, J. and Wen Chen, C. (eds). 1983. *Traditional medicine and health care coverage*. WHO, Geneva.
- Chancellor, P.M. 1971. *Handbook of the Bach flower remedies*. Saffron Waldon, Essex.
- Cotton, C.M. 1996. *Ethnobotany: principles and applications*. John Wiley & Sons, New York.
- Foster, G.M. and Anderson, B.G. 1983. *Medical anthropology*. John Wiley, New York.



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- Hughes, C.C. 1968. Ethnomedicine. In: *International Encyclopedia of Social sciences*. Vol. 10 MacMillan, New York.
- Jamil, T. 1997. *Complementary Medicine*. Butterworth Heinemann, Oxford.
- Jayasurya, A. 1997. *The Future of Complementary Medicines*. Medicina Alternativa, Colombo
- Kameswara Rao, C. 2000. *Database of Medicinal Plants*. KSCST, Bangalore.
- Keys, J.D. 1976. *Chinese herbs*. CE Tuttle Co., Tokyo.
- Lawless, L 1997. *The Complete Illustrated Guide to Aromatherapy*. Element Books Ltd., Dorset.
- Leavitt, D. 1974. *Chine herbal medicine*. DHEW Publishers, New York.
- Lele, R.D. 1986. *Ayurveda and Modern Medicine*. Baratiya Vidya Bhavan, Mumbai.
- Martin, G.S. 1995. *Ethnobotany*. Chapman and Hall, London.
- Mukherjee, B. (ed). 1993. *Traditional Medicine*. Oxford & IBH Pub. Co. Pvt. Ltd. New Delhi.
- Oliver-Bever, B.E.P. 1986. *Medicinal Plants of Tropical West Africa*. Cambridge University Press, Cambridge.
- Pushpangadan, P. 1995. *Ethnobiology in India: a Status Report*. All India Coordinated Research Project on Ethnobiology. Ministry of Environment and Forests, Govt. of India, New Delhi.
- Pushpangadan, P., Nyman, U. and George, V. 1995. *Glimpses of Indian Ethnopharmacology*. Tropical Botanic Garden and Research Institute, Thiruvananthapuram, Kerala.
- Schultes, R.E. and Reis, S. von (eds). 1995. *Ethnobotany: evolution of a discipline*. Chapman and Hall, London
- Savanur, H.V. 1993. *A Handbook of Ayurvedic Materia Medica*. Vol. I. Dr. Jarthar and Sons, Mathuri Street, Belgaum, Karnataka, India.
- Savanur, H.V. 1993. *A Handbook of Ayurvedic Materia Medica*. Vol. VI (4). Dr. Jarthar and Sons, Mathuri Street, Belgaum, Karnataka, India. Pp: 258-261.



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- Ayurveda and Aromatherapy. Miller, Light and Miller, Bryan, 1998. Banarsidass, Delhi.