SEMESTER – III			
Allied – III – Genetic Engineering			
Code:18UMIA31	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit: 3**

Vision:

To impart basic level information in the novel subject of Genetic Engineering.

Mission:

To enhance the knowledge on the applications of Genetic Engineering in various fields.

Course Outcome:

CO NO	Upon completion of this course, students will be able to	PSO Addressed	CL
CO - 1	infer basic knowledge about cloning	2	Un
CO- 2	identify the applications of genetic engineering in various fields	4	Ap
CO -3	explain cloning vectors	2	Un
CO-4	interpret the techniques used in genetic engineering	2	Un
CO -5	compare different types of vectors	4	An
CO- 6	explain Genetically modified food	2	Un
CO- 7	demonstrate the hazardous and potential risk in releasing transgenic into environment	6	Un
CO -8	make use of DNA Libraries	4	Ap

SEMESTER – III			
Allied – III – Genetic Engineering			
Code:18UMIA31	**Hrs/ Week: 4**	**Hrs/ Sem: 60**	**Credit: 3**

Unit–I

Genetic engineering – History – Tools of Genetic Engineering - Gene cloning- Steps in cloning- Gene transfer methods - Screening of chimeric DNA.

Unit–II

Cloning vectors for rDNA (Plasmids, Phages, Cosmids, Transposons)- Binary and Shuttle vectors.

Unit–III

Techniques in Genetic Engineering - Southern, Western, Northern blotting - PCR and its modification - DNA finger printing - DNA libraries.

Unit–IV

Applications of genetic engineering - Transgenic plants - Development of crops for disease resistance (Bt cotton) - herbicide tolerance- Medicine (Insulin) – Environment - role of superbug in biodegradation.

Unit-V

Genetically modified organisms – Advantages and disadvantages - Ecological impact of transgenic plant – Release of GMO into environment.

Text books:

1. Dr. Verma P.S and Dr. Agarwal. V. K . 2009. *Genetic Engineering* – S. Chand and Company Ltd. New Delhi.
2. Dubey R.C. 2014. *A Text Book of Biotechnology*. Fifth revised Edition. S Chand & Co. New Delhi.
3. Dr.Prakash. S Lohar 2005. *Text Book of Biotechnology* - MJP Publishers, Chennai.

Books for Reference:

1. Glick. B.R. and Pasternak, J.J. 2017. *Molecular Biotechnology – Principles and Applications of Recombinant DNA.* ASM Press, Washington D.C.
2. Brown, T.A. 2016. *Gene Cloning*. Third Edition. Seventh edition - Chapman and Hall Publications, USA.
3. Satyanarayana .U. 2013. *Biotechnology*. Books and Allied (P) Ltd.Kolkata.
4. Rastogi S.C, 2007. *Biotechnology Principles and applications.* Narosa Publishing House Pvt. Ltd. New Delhi.
5. Mohan P.Arora. 2005. *Biotechnology.* Himalaya Publishing House, Mumbai.
6. Jogdhand. S.N. *Gene Biotechnology.* 2009. Himalaya Publishing House Pvt.Ltd. Mumbai.

SEMESTER – IV			
Allied – IV – Mushroom Technology			
Code : 18UMIA41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credit : 3**

Vision:

To facilitate the students with wide knowledge about the mushroom technology.

Mission:

To inculcate the deep knowledge on mushroom technology.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	explain about the detailed information of edible and non – edible mushroom.	4	Un
CO-2	compare the cultivation of various types of mushrooms.	5	Un
CO-3	construct the mushroom house.	6	Cr
CO-4	compare different types of mushroom cultivation techniques and pure culture preparation.	7	An
CO-5	explain about economics of mushroom cultivation and their precaution.	6	Un
CO-6	interpret about the different modes of storage of mushroom.	5	Un
CO-7	illustrate about the various nutrition content present in mushroom.	4	Un
CO-8	make use of various types of foods prepared from mushroom.	6	Ap

SEMESTER – IV			
Allied – IV – Mushroom Technology			
Code : 18UMIA41	**Hrs/Week : 4**	**Hrs/Sem: 60**	**Credit : 3**

Unit – I

Nutritional and medicinal value of mushrooms - Historical account, Cultivation of button mushroom (*Agaricus bisporus*), milky mushroom (*Calocybe indica*), oyster mushroom (*Pleurotus sajor-caju*) and paddy straw mushroom (*Volvariella volvcea*)

Unit - II:

Structure and construction of Mushroom House- Layout of traditional and green house method and spawn lab. Preparation of Pure Culture. Cultivation technology - Substrates, bed preparation, spawning, Mushroom production.

Unit - III

Economics of mushroom cultivation – precautions in mushroom cultivation –area selection, spawn preparation, spawn run, harvesting, pest management.

Unit –IV

Storage and nutrition : Short time storage, Long term storage, Drying , Storage in salt solutions. Nutrition – Proteins , Amino acids , Mineral elements nutritions – Carbohydrate , Vitamins , Crude fibre content.

Unit – V

Value added products - Mushroom - Soup, Pickles, Powders, Jams ,Cutlet, Omelette , Samosa , Curry, mushroom biscuits, mushroom ketchup, mushroom chips, mushroom candy.

Text Books:

1) Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R, 1991. *Oyster Mushrooms, Department of Plant Pathology,* Tamil Nadu Agricultural University, Coimbatore.
2) Swaminathan, M. 1990. *Food and Nutrition*. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
3) Nita Bahl, 1988. *Hand book of Mushrooms,* II Edition, Vol. I & Vol. II.

Books for Reference:

1. Biswas S., Datta M. and Ngachan S.V. 2012. *Mushrooms: A Manual for Cultivation,* PHI.
2. Zadrazil F. and Grabbe K. 1983. *Edible Mushroom, Biotechnology* Vol. 3, Weinheim: Verlag Chemie, Berlin
3. Changs T. and Hayanes W.A. (Ed.) 1978. *Biology and Cultivation of Edible Mushrooms.* Academic Press. New York.
4. Tewari, Pankaj Kapoor, S.C., 1988. *Mushroom cultivation*, Mittal Publications, Delhi.

SEMESTER – IV			
Allied Practical – IV –Laboratory In Mushroom Technology			
Code : 18UMIAR2	**Hrs/Week : 2**	**Hrs/Sem : 30**	**Credit : 1**

Vision:

To provoke excellence for training and practising in the field of mushroom cultivation technology.

Mission:

To promote and encourage the entrepreneurship quality of every students for developing and providing them with a sustainable and profitable environment.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	give outline about the field of mushroom technology	1	Un
CO -2	explain the cultural characteristics of mushroom	1	Un
CO-3	develop the basic requirements for the high production of mushroom	4	Cr
CO-4	interpret the laboratrical concept of mushroom technology	2	Un
CO-5	to develop the mushroom cultivation skill	2	Cr
CO-6	analyze the nutritional significance of mushroom in our day to day life	2,3,4	An
CO-7	explain the purpose of mushroom of cultivation	1	Un
CO-8	organize students to develop mushroom cultivation farms to encourage their entrepreneurship.	2,3,4	Ap

SEMESTER – IV			
Allied Practical – IV –Laboratory In Mushroom Technology			
Code : 18UMIAR2	**Hrs/Week- 2**	**Hrs/Sem – 30**	**Credit – 1**

1. Isolation and purification – Tissue Culture Technique
2. Mother spawn preparation
3. Preparation of first and second generation spawn
4. Mushroom spore print and microscopic observation of spore
5. Cultivation of mushroom; Tropical and temperate types using compost/ Paddy straw /Agricultural wastes / sugar cane wastes etc., spawn running and harvesting.
6. Qualitative analysis of protein in the mushrooms
7. Qualitative analysis of sugar in the mushrooms
8. Qualitative analysis of lipid in the mushrooms
9. Visit to mushroom industry
10. Preparation of value added products mushroom soup , pickles

Books for Reference:

1. Biswas S., Datta M. and Ngachan S.V. 2012. *Mushrooms: A Manual for Cultivation,* PHI.
2. Zadrazil F. and Grabbe K. 1983. *Edible Mushroom, Biotechnology* Vol. 3, Weinheim: Verlag Chemie, Berlin
3. Changs T. and Hayanes W.A. (Ed.) 1978. *Biology and Cultivation of Edible Mushrooms.* Academic Press. New York.
4. Tewari, Pankaj Kapoor, S.C., 1988. *Mushroom cultivation,* Mittal Publications, New Delhi.
5. Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R , 1991. *Oyster Mushrooms,* Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
6. Swaminathan, M. 1990 *Food and Nutrition*. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
7. Nita Bahl , 1984-1988. *Hand book of Mushrooms,* II Edition, Vol. I & Vol. II.

SEMESTER- III			
Allied practical III – Laboratory in Genetic Engineering			
Code : 18UMIAR3	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credit: 1**

Vision:

To impart advanced level of laboratory techniques in the field of Genetic Engineering.

Mission:

To develop skill among students in the recent genetic engineering techniques.

Course Outcome:

CO NO	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	illustrate the principle behind any genetic engineering practical	2	Un
CO-2	develop basic handling skill in genetic engineering practical	2	Ap
CO-3	experiment with isolation of Nucleic acids from different sources	4	Ap
CO-4	interpret Transformation	1	Un
CO -5	test for the quantification of nucleic acids	2	An
CO-6	distinguish the quantification of DNA and RNA	2	An
CO-7	distinguish the isolation of DNA and RNA	4	An
CO-8	compare the theory with the protocol of PCR	2	An

SEMESTER- III			
Allied practical III – Laboratory in Genetic Engineering			
Code : 18UMIAR3	**Hrs/Week: 2**	**Hrs/Sem: 30**	**Credit: 1**

1. Isolation of genomic DNA from bacteria.
2. Isolation of genomic DNA from plant source.
3. Isolation of DNA from animal source.
4. Isolation of RNA from bacteria.
5. Isolation of RNA from plant source.
6. Isolation of RNA from animal source.
7. Polymerase Chain Reaction (Demonstration).
8. Quantification of DNA.
9. Quantification of RNA.

Books for Reference:

1. Janarthanan. S. and Vincent.S. 2007. *Practical Biotechnology*: Methods and Protocols. Universities press (India) private limited. Hyderabad
2. JyotiSaxena, Mamta Baunthiyal, Indu Ravi. 2012. *Laboratory manual for Microbiology, Biochemistry and Molecular Biology*.Scientific Publishers, India.
3. Sambrook and Russell. *Molecular Cloning – A Laboratory Manual*, Vol. 1,2,3. Third Edition. Cold Spring Harbor Laboratory Press, Cold Spring Harbor, New York.
4. John Vennison. S. 2009. *Laboratory manual for Genetic engineering.* PHI Learning Pvt Ltd, Delhi.

SEMESTER- IV			
Core VI - Agricultural Microbiology			
Code : 18UMIC41	**Hrs/week: 4**	**Hrs/Sem: 60**	**Credit:4**

Vision:

To enhance knowledge of various microbial activities and its impact on the environment and study about various beneficial aspects of soil microbes.

Mission:

To study the plant diseases and to control the pest using bio pesticide related to bacteria, fungi, and viruses.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO -1	analyze the soil microorganism and their properties.	1	An
CO- 2	determine the role of microbes on environment.	1	Ev
CO -3	distinguish positive and negative interactions	1	An
CO- 4	outline the interaction between microbes and soil.	4	Un
CO- 5	discuss about the plant diseases such as bacterial, fungal and viral disease.	6	Cr
CO- 6	summarize the causative agents and control measures of the plant disease.	6	Un
CO -7	determine the Biopesticide and Biofertilizer development	2	Ev
CO -8	evaluate the microbes used asBiopesticide and Biofertilizer	4	Ev

SEMESTER- IV			
Core VI - Agricultural Microbiology			
Code : 18UMIC41	**Hrs/week: 4**	**Hrs/sem: 60**	**Credit:4**

Unit-I

Properties of soil - Physical and Chemical - Microbial flora of soil - Bacteria, Fungi, Algae, Actinomycetes and Nematodes) –Factors affecting microbial population.

Unit-II

Biogeochemical cycle- Carbon, Phosphorus, Nitrogen – Biological Nitrogen Fixation – Symbiotic (*Rhizobium*) and Asymbiotic (*Azotobacter*)– Root nodule formation - and Nitrogenase, Hydrogenase.

Unit-III

Microbial interactions between microbes - Mutualism, Commensalism, Competition, Amensalism, Parasitism and Predation.Interaction of microbes and plants – Rhizosphere and Phyllosphere.

Unit-IV

Plant pathology (Etiology, symptoms, disease cycle and control measures) – Bacterial diseases – Blight of rice, Citrus canker – Fungal disease – Red rot of sugarcane, Tikka leaf spot of groundnut – Viral disease – Bunchy top of Banana, Tobacco mosaic.

Unit-V

Biopesticides - Bacterial (*Bacillus thuringiensis*)- Fungal (*Trichoderma viridae*)- Viral (NPV & CPV). Biofertilizer – *Rhizobium*, *Azotobacter*, Cyanobacteria, Azolla – Mass multiplication and crop response.

Text books:

1. Dubey R.C. 2014. *A Text Book of Biotechnology*. Fifth revised Edition. S Chand & Co. New Delhi.
2. Dubey R.C. and D.K. Maheshwari. 2013. *A Text Book of Microbiology*. S. Chand & Co. New Delhi.

Books for Reference:

1. Shiva Aithal. C. 2010. *Mordern approaches in Soil, Agricultural and Environmental Microbiology.* Himalaya Publishers, New Delhi.
2. Atlas,R.M. and Bartha.M. *Microbial Ecology –Fundamentals and applications.* Fourth edition - Benjamin – Cummings, Mento Park, California.
3. Martin Alexander. 1983. *Introduction to Soil Microbiology,* Wiley eastern Ltd., New Delhi.
4. K. VIjaya Ramesh. 2005. *Environmental Microbiology* – MJP Publishers, Chennai
5. SubbaRao. N.S. 1995. *Soil Microorganisms and Plant growth*. Ed,Oxford and IBH Publishing Co, Pvt. Ltd, New Delhi
6. Ravichandra. N. G. 2013. *Fundamentals of plant pathology* – PHI Learning Private Ltd. Delhi.
7. Rangaswamy.G. and Bagyaraj.D.J. 1996. *Agricultural Microbiology*. Second Edition - Prentice- Hall of India Pvt Ltd., New Delhi.

SEMESTER- IV			
Core practical IV – Laboratory in Agricultural Microbiology			
Code : 18UMICR4	**Hrs/week: 2**	**Hrs/Sem: 30**	**Credit: 1**

Vision:

To impart skill on isolation of various microbes from soil and plant.

Mission:

To enhance advanced level laboratory training in Agricultural Microbiology.

Course Outcome:

CO NO	Upon completion of this course, students will be able to	PSO addressed	CL
CO -1	test for isolation of various soil microbes	5	An
CO- 2	experiment with isolation of microbes from various agro samples.	5	Ap
CO -3	interpret the preparation of Bio fertilizer and its assay	4	Un
CO -4	infer quantitative assay of microbes from various agro samples	2	Un
CO- 5	interpret staining of VAM	5	Un
CO -6	analyse antagonism between microorganisms	2	An
CO -7	demonstrate the isolation of Phosphate solubilizing bacteria	5	Un
CO- 8	identify nitrogen fixing bacteria	5	Ap

1. Determination of Soil pH.
2. Determination of Soil temperature.
3. Quantitative assay of microbes in soil.
4. Quantitative assay of microbes in Rhizosphere.
5. Quantitative assay of microbes in Phyllosphere.
6. Isolation of phosphate solubilizing bacteria.
7. Isolation of Phosphate solubilizing fungi.

8. Isolation of *Rhizobium* sp from root nodules of leguminous plants.
9. Isolation of *Azotobacter* sp from soil.
10. Isolation of *Azospirillum* sp from soil.
11. Identification of Cyanobacteria from soil. (Anabaena and Nostoc).
12. Staining of VAM.
13. Preparation of biofertilizers.
14. Assay of biofertilizer (Seed treatment, Seedling treatment, Soil inoculation, Measurement of root and shoot system.
15. Study of antagonism between microorganisms.

Books for Reference:

1. Jyoti Saxena, Mamta Baunthiyal, Indu Ravi. 2012. *Laboratory manual for Microbiology, Biochemistry and Molecular Biology*. Scientific Publishers, India.
2. Gunasekaran. P. 2005. *Laboratory Manual in Microbiology*.First edition. New Age InternationalLtd., Publishers, New Delhi.
3. Dubey, R.C.and Maheswari,D.K. 2002. *Practical Microbiology*. Second edition. Chand and Company Ltd., India.
4. Aneja K.R. 1993. *Experiments in Microbiology,Plant Pathology and Biotechnology.* Fourth edition. New Age International Publishers, New Delhi.
5. Harold J. Benson, Alfred E. Brown - 2006. *Benson's Microbiological applications: Laboratory manual in General Microbiology.* International Edition, McGraw Hill Higher Education.

SEMESTER-IV			
NME II - Clinical Microbiology			
Code:18UMIN41	**Hrs/Week: 2**	**Hrs/Sem:30**	**Credit: 2**

Unit - I

Sources of infection - Routes of transmission - control measures - Testing by Koch's postulates - Antibiotic sensitivity testing

Unit - II

Bacterial pathogens - *Streptococcal, Staphylococci, E.coli, Vibrio, Salmonella, Shigella* and *Mycobacterium*

Unit – III

Fungal pathogens - *Candida, Aspergillus - Dermatophytes*

Unit - IV

Viral pathogens - Pox virus, Mumps virus, Rabies virus and HIV

Unit - V

Protozoan pathogens - Malarial, Amoebic , Giardiasis and Yellow fever

Text Books:

1. Ananthanaryanan R and Panikar J , 2000. *Text book of Microbiology*, Orient Longmans.
2. Rajan.S. 2007 . *Medical Microbiology*, MJP Publisher, Chennai

Books for Reference:

1. Kanika L Mukherjee, *Medical Laboratory Technology,* Mc Graw Hill Publishing Co., Ltd., New Delhi Vol I-III
2. Salle, A.J.,1996. *Fundamental Principles of Bacteriology*. (7th edition), Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Pelczar Jr.,M.J., Chan E.C.S. and Kreig, N.R. 1993. *Microbiology.* McGraw Hill Inc., New York.

SEMESTER-IV	
Self Study (Optional) -Probiotics	
Code:18UMISS2	**Credits: +2**

Vision:

To provide the learners with the best learning experience in Probiotics by self study education and enabling the students to become entrepreneurs and socially responsible.

Mission:

To develop young students with active and creative minds in the field of microbiology. To motivate learners to contribute to sustainable development of nation through environmental protection and social responsibility

Course Outcome:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recall the basic knowledge on probiotics	3	Re
CO -2	acquaint with characteristics of probiotics	1,2	Kn
CO-3	analyse the aware the probiotics organisms.	2	Ev
CO-4	interpret the knowledge on the roles of probiotics.	1,2	Ap
CO-5	differentiate the probiotics and prebiotics	1,2	Co
CO-6	explain the concept of mechanisms of probiotics	2	Un, Ap
CO-7	grasp the knowledge about prebiotics.	2,3	An
CO-8	know the wealth of the probiotics and prebioticsm	2	Kn

SEMESTER – IV			
Core Skill Based - Biostatistics			
Code: 18UMIS41	**Hrs/Week - 4**	**Hrs/Sem - 60**	**Credit: 4**

Vision

To impart advance level information in the subject of Biostatistics.

Mission

To make the students aware of the concepts in Biostatistics.

Course Outcome:

CO No	Upon completion of this course, students will be able to	PSO addressed	CL
CO- 1	develop an understanding of the basic concepts of biostatistics	2	Cr
CO -2	explain the statistical methods	4	Un
CO - 3	recall the collection, processing and presentation of data	2	Re
CO -4	explain measures of central tendency	4	Un
CO- 5	examine measures of dispersion	2	An
CO -6	determine the types and measures of correlation	2	Ev
CO- 7	define regression	4	Re
CO -8	interpret statistical inference	4	Ev

SEMESTER – IV			
Core Skill Based - Biostatistics			
Code: 18UMIS41	**Hrs/Week : 4**	**Hrs/Sem : 60**	**Credit: 4**

Unit-I

Biostatistics - Definition - Statistical methods - Basic principles. Variables - Measurements, Functions, Limitations and Uses of statistics.

Unit-II

Collection of data primary and secondary - Types and Methods of data collection procedures - merits and demerits.Classification - Tabulation and Presentation of data - sampling methods.

Unit-III

Mean, Median, Mode, Geometric mean - merits & demerits. Measures of dispersion - Range, Standard deviation, Mean deviation, Quartile deviation - merits and demerits

Unit-IV

Types and Methods of Correlation, Regression, simple regression equation, similarities and dissimilarities of correlation and regression.

Unit-V

Hypothesis - Simple hypothesis - Student's test - Chi square test.

Text Books:

1. N. Gurumani. 2005.*An introduction to Biostatistics* – MJP Publishers, Chennai.
2. Veer BalaRastogi.2009. *Fundamentals of Biostatistics* – Ane Books Pvt. Ltd, New Delhi.
3. Dr.Pranab K. Banerjee. 2011. *Introduction to Biostatistics (A Text Book of Biometry)* – Revised and Fourth enlarged edition – S. Chand & Company LTD, New Delhi.
4. A. K. Sharma. 2005.*A Text book of Biostatistics* – Discovery Publishing House.

Books for Reference:

1. Danniel. W.W. 1987. *Biostatistics*. John Wiley Sons, New York.
2. Sundar Rao. P.S.S and Richards.J. *An introduction to Biostatistics*. 3rd edition. Christian Medical College, Vellore.
3. Selvin, S. 1991. *Statistical Analysis of epidemiological data*. New York University Press.
4. Campbell. R.C. 1998. *Statistics for Biologists*. Cambridge University Press.

SEMESTER-IV	
Self Study (Optional) -Probiotics	
Code:18UMISS2	**Credits: +2**

Vision:

To provide the learners with the best learning experience in Probiotics by self study education and enabling the students to become entrepreneurs and socially responsible.

Mission:

To develop young students with active and creative minds in the field of microbiology. To motivate learners to contribute to sustainable development of nation through environmental protection and social responsibility

Course Outcome:

CO. No	Upon completion of this course, students will be able to	PSO addressed	CL
CO-1	recall the basic knowledge on probiotics	3	Re
CO -2	acquaint with characteristics of probiotics	1,2	Kn
CO-3	analyse the aware the probiotics organisms.	2	Ev
CO-4	interpret the knowledge on the roles of probiotics.	1,2	Ap
CO-5	differentiate the probiotics and prebiotics	1,2	Co
CO-6	explain the concept of mechanisms of probiotics	2	Un, Ap
CO-7	grasp the knowledge about prebiotics.	2,3	An
CO-8	know the wealth of the probiotics and prebioticsm	2	Kn

SEMESTER-IV	
Self Study (Optional) -Probiotics	
Code:18UMISS2	**Credits: +2**

Unit : I

Probiotics: Introduction and history of Probiotics, Probiotic microorganisms.

Unit : II

Characteristics of Probiotics for selection: Toleranceto additives, stability during storage, stability maintenance of probiotic microorganisms.

Unit : III

Role of Probiotics in health and disease: prevention and treatment of gastero-intestinal bacterial infection treatment of chronicurinary tract infection, antitumor and cholesterol level

Unit : IV

Mechanism of probiotics: production of antimicrobial substances, modulation of immune system, alteration of intestinal bacterial metabolite action

Unit : V

. Prebiotics: concept, definition, criteria, types and sources of prebiotics, prebiotics and gut microflora - Prebiotics and health benefits: mineral absorption, immune response, cancer prevention, elderly health and infant health, prebiotics in foods.

Books for References:

1. Salminen. S and Wright , A. V. 1998. *Lactic Acid Bacteria*, Marcel Dekker
2. Glenn R. G. Marcel R. 2008. *Handbook of Prebiotics* CRC press
3. LeeY K, Salminen S 2009. *Handbook of Probiotics and Prebiotics* . AJohn Willey and Sons Inc. Publication
4. SandholmT. M. Saarela M. 2003. *Functional Dairy Products* CRC Woodhead Publishing Limited.