Punyashlok Ahilyadevi Holkar Solapur University, Solapur

NAAC Accredited 2022
'B^{++}' Grade (CGPA 2.96)

Name of the Faculty: Science & Technology

New Education Policy 2020

Syllabus: Entrepreneurship

Name of the Course: M.Sc.- I (Semester I & II)

(Syllabus to be Implemented from w.e.f. 2023)

Punyashlok Ahilyadevi Holkar Solapur University, Solapur

Syllabus for the Master of Science in Entrepreneurship (As per NEP - 2020)

Applicable from the Academic Year 2023 –2024

Preamble:

Overall scenario of student trends in selecting courses for studies is very typical. Most of the science students tend to choose the professional courses, particularly leading to studies in medical sciences and Engineering and relatively less number of students opt for degrees in Biosciences. For several years now, the first preference of students desiring to enter the field of Life Sciences particularly, Microbiology, Botany, Zoology, and for last 5 to 6 years, it has shifted partly to Biotechnology course. This trend has been followed by chemical sciences. Both these disciplines viz. Microbiology and Biotechnology deal with overlapping interests. Microbial sciences focus more on study of the microbial world while Biotechnology focuses more on industrial applications relating to plants and animals.

The main theme of teaching these courses, however, remains the same i.e. application of basic principles of Life Science to develop into technology. Modern biology combines the principles of chemistry and biological sciences (molecular and cellular biology, genetics, and immunology) with technological disciplines (engineering, computer science) to produce goods and services and even for environmental management. The M.Sc. Entrepreneurship course is aimed to develop the industry-based science curriculum in the various subjects like industrial Microbiology, Industrial Chemistry and Industrial Biotechnology with the syllabus of Commerce and management subjects which could help to develop the Science entrepreneurs. The Board of Studies in Entrepreneurship has identified the following thrust areas and prospective plans for syllabi reforms at postgraduate level:

Industrial Microbiology – includes application of bacteria, fungi, protozoa and viruses in traditional (food, dairy, wine, antibiotics, fermentation, etc.) and biotechnological industries. Agriculture – includes Microbial Biofertilizer, SCP and Biopesticide.

Industrial Chemistry-This includes the techniques like –Nitrification, Sulphonation, Halogenations, Esterification and Polymerization, **Chemical industries- c**hemical fertilizers, leather, food chemistry, cement, glass, paint and pigments, dyes, attar, soap, pulp and paper, textiles, metals and minerals, petro chemicals etc.

Industrial Biotechnology –This includes the four major industrial areas, including health care (medical), crop production and agriculture, animal husbandry, non-food uses of crops and other products (e.g. biodegradable plastics, vegetable oil, biofuels, and environmental uses).

Commerce and Management-This includes the legal aspects of business for technical compliances, fund raising techniques, human skills and soft skills, market survey, market feasibility and product planning etc**.**

In addition, we feel that the students should be well acquainted with industrial techniques which include different skill developments in various related fields. The skills will help the students to develop themselves as entrepreneurs.

Introduction

The syllabi till today had been sufficient to cater for the needs of students for building up their careers in industry. However, with the changing scenario at local and global level, we feel that the syllabus orientation should be altered to keep pace with developments in the industrial sectors. The need of the hour is proper syllabi that emphasize on teaching the technological as well as the administrative aspects. . Theory supplemented with extensive laboratory expertise will help these students, to avail these opportunities. Both these aspects i.e. theory and more of practical needs to stressed, such that a post-graduate student can start work directly in applied fields like-industry without any additional training. Thus, the university / college itself will be developing the trained and skilled man-power. We will find the trained teachers who can share their experiences on different aspects in microbiology, biotechnology and chemistry and we plan to restructure the syllabus in this viewpoint. The restructured syllabus will combine the principles of chemistry and biological sciences with technological disciplines to produce goods and services with proper management. Entrepreneurship curricula are operated at two levels viz. undergraduate and postgraduate. The undergraduate curricula are prepared to impart basic knowledge of the respective subject from all possible angles. The institute will raise the Entrepreneurship Park for the students admitted.

1. **Title**: M.Sc. Entrepreneurship
2. **Faculty**: Faculty of Science and Technology.
3. **Year of Implementation**: For M. Sc. I (Semester I and Semester II): From August 2023 and for M. Sc. II (Semester III and Semester IV): From 2024.

4. Program Outcomes (POs):

a) To demonstrate, solve, and have an understanding of major concepts in Entrepreneurship.

b) To introduce the concepts of application of industrial microbiology, chemistry and biotechnology leading to a successful entrepreneur.

c) To employ critical thinking and scientific knowledge in the field of entrepreneurship.

d) To create an awareness of the impact of industries on the environment, society, and development among the scientific community.

e) To inculcate sense of scientific responsibilities and social and environment awareness.

f) To help the students in building-up the progressive and successful career.

g) To enrich students with technical knowledge and train them in Entrepreneurship.

5. Program-Specific Outcomes (PSOs):

a) Students will develop critical thinking and the Analytical mind by taking knowledge in advanced-level Chemistry

b) Analytical or experimental skills make the students capable of starting new venture.

c) Students will gain a thorough Knowledge of the subject to work on projects at different research and academic institutions.

d) Students will become familiar with the different branches like Industrial Chemistry, Industrial Micro-biology and Industrial Bio-technology.

e) Students will also learn to apply appropriate techniques for market analysis.

f) Employability Skills shall enable the students to become first-generation entrepreneurs.

g) Entrepreneurial Skills shall empower the students to start their industries/businesses.

6. Duration of Course – 02 years.

The students have to record their daily attendance biometrically, 80% attendance is must, otherwise the concerned will not be allowed for the examination.

7. Fees structure-As per the University rules and regulation. The fees to be paid in the beginning of the academic year.

8. **Eligibility-** B. Sc. with principle subject like- Entrepreneurship, Chemistry, Biotechnology, Agriculture, Agriculture Biotechnology, Botany, Zoology, Microbiology, Bioinformatics, Biochemistry, B. Pharmacy, Agri Business Management and Plant protection, Bachelor of Engineering.

9. **Medium of Instruction**: English

10. **Scheme of Teaching and Examination:**

(Applicable to University Department and University affiliated college centers)

a. Each unit in theory course shall comprise 15 lectures, each of 60 minutes duration and there shall be four lectures per theory course per week.

b. Entire program of M. Sc. Entrepreneurship will be of **2200** marks (550 Marks per semester)

c. Examination of each **theory course** shall be of **100 marks** (80 university examination + 20 internal assessment). University examination of 80 marks (3 hours' duration) will be conducted at the end of each Semester. Internal assessment of 20 marks will be done before the semester examination during each semester.

d. Examination of practical course shall be of 150 marks per semester.

e. Research Project is compulsory at second year. (10 Credits)

f. On-the Job training is mandatory at second semester (4 Credits)

g. Question papers will be set in the view of the entire syllabus and preferably covering each unit of the syllabus. Equal weightage should be provided to each unit.

11. Standard of Passing:

There will be separate passing for theory courses and practical courses. Minimum 40% marks will berequired for passing separately for theory and practical courses.

12. Nature of Question paper and scheme of marking:

- Theory question paper: Maximum marks -80
- Total No. of questions – 7
- All questions are of equal marks. Out of these seven questions five questions are to be attempted. Question No.1 is compulsory and objective/short answer type. Total number of bits is 16 with one mark each. Total marks – 16 (which cover multiple choices, fill in the blanks, definition, true or false). The sequestions will be answered along with other questions in the same answer book.
- Question No. 2 is also compulsory (4 sub questions having 4 Marks each).
- Remaining 5 questions have 2 sub questions of 8 Marks each. Any three questions are to be attempted. The answers are to be written in the same answer book.

M.Sc. I Entrepreneurship

(June, 2023) Syllabus Structure

Level/ Difficulty	Semester	Paper Code	Title of the Paper	Semester exam			L	T	P	Credits
			Mandatory	**Theory**	**IA**	**Total**				
		DSC-1	Industrial Chemistry- I	80	20	100	4	--	-	4
		DSC-2	Industrial Microbiology- I	80	20	100	4		-	4
			Elective (Anyone)							
		DSE-1.1	Agricultural Biotechnology- I	80	20	100	4		-	4
		DSE-1.2	Entrepreneurial Skills -II	80	20	100	4		-	
	I		**Minor**							
		RM	Entrepreneurial Research, Innovation & Start up	80	20	100	4	-	0	4
			Practical							
		DSC-1 P	Based on Industrial Chemistry- I	40	10	50	-	-	2	6
		DSC-2 P	Based on Industrial Microbiology- I	40	10	50	-	-	2	
6.0/400			**Elective (Any one)**							
		DSE-1.1 P	Based on Agricultural Biotechnology- I	40	10	50			2	
		DSE-1.2 P	Based on Entrepreneurial Skills -II	40	10	50			2	
			Total for I semester	**440**	**110**	**550**	**16**	**550**	**6**	**22**
			Mandatory							
		DSC-3	Industrial Chemistry- II	80	20	100	4	--	-	4
		DSC-4	Microbial & Agriculture Technology -II	80	20	100	4		-	4
			Elective (Any one)							
		DSE-2.1	Industrial Chemistry-III	80	20	100	4		-	4
		DSE-2.2	Entrepreneurial Funding	80	20	100	4		-	
		DSE-2.3	Business Legislation & IPR	80	20	100	4			
			Minor							
	II	**OJT/In house Project/Internship/Apprenticeship**	Industrial Processing / Working	80	20	100	4	-	0	4
			Practical							
		DSC-3 P	Based on Industrial Chemistry- II	40	10	50	-	-	2	6
		DSC-4 P	Based on Microbial & Agriculture Technology -II	40	10	50	-	-	2	
			Elective (Any one)							
		DSE-2.1 P	Based on Industrial Chemistry-III	40	10	50			2	
		DSE-2.2 P	Based on Entrepreneurial Funding	40	10	50			2	
		DSE-2.3 P	Based on Business Legislation & IPR	40	10	50			2	
			Total for II semester	**440**	**110**	**550**	**16**	**550**	**6**	**22**

L= Lecture, T = Tutorials, P = Practical

4 Credits of Theory = 4 Hours of teaching per week

2 Credits of Practical = 4 hours per week

DSC- Discipline Specific Course

DSE- Discipline Elective course

RM- Research Methodology

OJT- On Jon Training

M.Sc. I Entrepreneurship

Semester – I

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	DSC-1	Industrial Chemistry- I	80	20	100	4	-	-	4

[15]

Unit I: Nitration

Introduction; Nitrating agents, Aromatic nitration, Thermodynamics of Nitration's; Heatof Nitration; Process equipment for technical nitration; Mixed acid for nitration- Acidprocessing, Mixed acid composition, D.V.S. Calculation, Relation between D.V.S. and Stabilityof Nitrate or Charge; Typical industrial Nitration process (Nitrobenzene, and α-Nitronaphthalene).

Unit II: Sulphonation [15]

Introduction; Sulphonating agents and their applications; Thermodynamics of sulfonation; The Desulphonation Reaction – General consideration, Separation of isomers, Raw material and waste Recovery; working -up procedures; Industrial equipments and Techniques-Material of construction, Commercial Sulfonation Methods; Technical preparation of Sulfonates - Aromatic Sulfonates (The mono sulfonation of Benzene, Anthraquinone -1- Sulfonates).

Unit III: [15]

A) Halogenation

Introduction; Chlorination of cycloparaffins; Preparation of Ethylene dichloride; Design and Construction of Equipment for Halogenation; Technical Halogenations – Manufacturing processes for monochloroacetic acid, Chloral, Monochlorobenzene, and Vinyl chloride (Ethylene and Acetylene).

B) Esterification

Introduction; Esterification by organic acid; Esterification of carboxylic acid Derivative; Ester by addition to unsaturated system; Manufacture of ethyl acetate, Vinyl acetate, Cellulose acetate.

Unit IV: Polymerization [15]

Introduction; Chemistry of polymerization reactions; Methods of polymerization, polymerization kinetics; Industrially importance polymerization and polymers: Phenolic, urea and melamine and alkyl resins, Polyamides, Polyesters, Epoxy resins, Polyethylene, Polypropylene, Vinyl polymers, Polystyrene, Acrylonitrile polymers. **Oxidation** Introduction; Types of oxidative reactions; Liquid phase oxidation with oxygen-Acetaldehyde to Acetic acid, Vapor phase oxidation aliphatic compound- oxidation of Methanol.

Reference Books

1. P.H.Groggins: Unit processes in organic synthesis (MGH)
2. F.A.Henglein: Chemical Technology (Perga mon)
3. M.G.Rao & M. Sitting: Outlines of Chemical Technology (EWP)
4. Clausen,Mattson: Principle of Industrial Chemistry
5. F.A. Lowenheim & M.K. Moran: Industrial Chemicals
6. Kirks & others: Encyclopedia of Chemical Technology
7. Kent: Riegels Industrial Chemistry (N-R)
8. Prakash G. More, Comprehensive Industrial Chemistry, Pragati Prakashan, Meerut (Uttar Pradesh)
9. S.D.Shukla & G.N.Pandey: A text book of Chemical Technology Vol. II
10. J.K.Stille: Industrial Organic Chemistry (PH)
11. Billmayer: A txt book of Polymer Science

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	DSC-2	Industrial Microbiology- I	80	20	100	4	-	-	4

Unit-I

Aseptic technique: [15]

Contamination, sterilization (heating, steam sterilization, tyndallization, dry heat, chemicals, radiation sterilization, filter sterilization), sterilization of air. Sterile area and its maintenance, environmental monitoring, types of environmental monitoring, methods of sterilization in pharmaceutical, disinfectants and antiseptics, evaluation of disinfectants.

Unit-II

Pure culture technique [15]

Serial dilution, Streak plate, Pour plate, Spread plate. Cell Enumeration Techniques- Direct methods, DMC, Neubauer chamber, Indirect Methods- SPC/TVC, Membrane filter technique. Maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria.

Unit-III

Media, staining and Biochemical Tests [15]

Components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media. Living media- Eggs, cell lines, animals. Simple staining, Gram staining, Negative staining, Media composition, mechanism and significance- IMViC, test, Starch hydrolysis test, sugar utilization test, triple sugar iron agar test,

Unit-IV

Fundamentals of Fermentation [15]

Principal of exploitation of microorganism and their products, Design of other fermentation vessels, screening of microorganism, primary and secondary screening, strain development strategies, fermentation media, downstream processing, Waste Disposal.

Reference Books:

1. Industrial Microbiology: Casida .
2. Industrial Microbiology by A.H. Patel
3. Principles of Fermentation Technology - Whitekar and Stanbury.
4. Industrial Microbiology - Prescoot and Dunn.
5. General Microbiology – Pawar and Dignawal Vol- I and II.
6. Textbook of Microbiology – Pelczar.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	DSE-1.1	Agricultural Biotechnology- I	80	20	100	4	-	-	4

Unit-I **[15]**

Industrial Production of Biofertilizer: Nitrogen fixing bio-fertilizers: Concept & its need in organic farming, Rhizobium Bio fertilizer, Azotobacter Bio-fertilizer, Azospirillum Bio- fertilizer, Phosphate Solubilizing Bio-fertilizers: VAM Bio-fertilizer, PSB Bio fertilizer (Phosphate Solubilizing Bacteria), Quality control of Bio fertilizers as per FCO (Fertilizer Control Order)

Unit-II **[15]**

Fermented Foods: Definition, types, advantages and health benefits, Dairy/Milk Based: Dahi/Yogurt, Buttermilk (Chach) and cheese, Vegetable Based: Pickels, Saeurkraut, Grain Based: Soy sauce, Bread, Jilebi, Miso, Tofu, Idli and Dosa, Probiotic Foods: Definition, types, microorganisms and health benefits.

Unit-III **[15]**

Biopesticide: Classification and general account of microbes used as Bioinsecticides, bioherbicides, biofungicides. Secondary Agriculture Biotechnology: Biomanure, biogas, biofuels – advantages and processing parameters.

Unit-IV **[15]**

Enzymes in food processing: Need of enzymes, sources of enzymes, Applications of enzymes in: Production of high fructose syrup, Fruit juice industry, Baking industry, Oils and fat processing, Typical Fermentation processes – Industrial production of: Indol Acetic acid, Siderophores, Gibberellins'.

Reference Books

1. Stanbury P. F, Whitaker A. and Hall S. J. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.
2. Peppler H.J., Perlman D. (2004). Microbial technology-Fermentation Technology, second edition, Volume I and II, Academic Press.
3. Food Microbiology (1995)-Adams M.R.and Moss, M.O., New Age International Limited.
4. Food Microbiology –Frazier, W.C., Westhoff, D.C. IVth edition, Tata McGraw Hill Publisher.
5. Madigan, M. Martinkoj, M. and Parker (10 ed.) 2003. Biology of Microorganisms. Prentice Hall of India Pvt. Ltd., New Delhi. Borkar,S.G. 2015.
6. Beneficial Microbes as Biofertilizers and its Production Technology Woodhead Publisher,India,New Delhi.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	DSE-1.2	Entrepreneurial Skills -II	80	20	100	4	-	-	4

Unit – I **[15]**

Nature & scope of managerial economics: Nature of marginal analysis; alternative objectives of business firm; cardinal utility theory; indifference curve technique and the theory ofconsumer choice; consumer surplus; price, income and substitution effects; demand elasticity; demand estimation and forecasting; relationship between price elasticity and marginal revenue.

Unit – II **[15]**

Law of variable proportions: Laws of return; optimal input combination; output-cost relation; engineering cost curves; technological change and production decisions; revenue curvesof a firm; duopoly analysis using reaction curves; price-output decisions under alternative marketstructures; shut-down points; Baumol's sales maximization model, advertising and price-output decisions.

Unit – III **[15]**

Collusive behavior of firms: Cartel behavior; game theory and strategic behavior; product differentiation and price discrimination; price-output decision in multi-plant and muti- product firms; managerial theories of the firm; general pricing strategies; special pricing techniques – limit pricing, peak load pricing and transfer pricing; dumping analysis; pricing of public utilities.

Unit – IV **[15]**

Risk analysis: Investment and capital replacement decisions; locational choice of a firm; measures of national income; business cycles; operative aspects of macroeconomic policies; inflation analysis; tariff analysis.

Reference Books

1. Economics - Lipsey, R.G. and A.K. Chrystal, Oxford Univ. Press
2. Economics: Principles and Applications - Mankiw, N.G., Cengage Learning.
3. Business Economics - H.L. Ahuja, S. Chand Publication
4. Managerial Economics - Suma Damodaran, Oxford University Press
5. Managerial Economics - Geetika, Ghosh & Choudhury, Cengage Learning, New Delhi
6. Managerial Economics - Moyer &Harris, Tata Mcgraw-Hill, New Delhi.
7. Modern Microeconomics - Koutsoyiannis, A., MacMillan Press
8. Managerial Economics - D N Dwivedi, Vikas Publishing House.
9. Managerial Economics - D M Mithani
10. Pindyck, R.S., D. L. Rubinfeld and P. L. Mehta; Microeconomics, Pearson Education.
11. Principles of Economics – Agrawal H. S.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	RM	Entrepreneurial Research, Innovation & Start up	80	20	100	4	-	-	4

Unit - I **[15]**

a) Entrepreneurial motivation/ Introduction:

Taking product or service ideas to creating value: Why should one choose to become an entrepreneur, Entrepreneurial mind-set, Intrapreneurship

b) Design Thinking and Affordable Innovation & Creativity:

Introduction to engineering design process and the concept of frugal engineering for developing innovative affordable products, Idea generation & Prototype Development, Technological and Non technological Innovation and process, effective user-interface, Concept of Creativity & its process

c) Incubation:

Meaning, Concept for Product & Service, Use of Incubation centre for entrepreneurship development, Intellectual Property Right (IPR) & Patents

[15]

Unit - II

a) Product Innovation:

Introduction to the bottlenecks of new product innovation process

b) Digital Technology Entrepreneurship:

Industry 4.0 landscape and innovations using digital technologies like AI, IOT, AR/VR, Cloud, SAAS, User Applications. The basic technology framework and development platforms

c) Analytics- based opportunities: Entrepreneurship in Data Analytics

[15]

Unit - III

a) **Going to market Strategy:**

Understanding and delivering Value, Product- Market Matrix, Delivery Strategy with a Difference

b) Startup Economics:

Economic consideration for starting a venture, Understanding Feasibility analysis

Market considerations for startups: Understanding market, targeting customer and positioning product

c) **Business Development Tools**:

Business model innovation, Business process management, competitive advantages, Business model canvas

Unit – IV **[15]**

a) Research & Development:

Concept, process, tools, Techniques, Merits & Demerits, Reviews, Application based research, market research, Research Report Writing

b) **Business Plan Presentation**: Tools & Techniques of Presentation

c) **Commercialization of Project:**

Pilot study of project, Financing Project, Implementation of Project, Review of project, Commercial Execution of Project. Govt. Schemes and funding support to ideas, innovations, and startup

Books/References:

1. Entrepreneurship –by Robert D. Hisrich (Edition-9)
2. Entrepreneurship- Theory, Process & Practice –by Kuratko & Hodgetts, Thompson South-Western Publication iii. Innovation and Entrepreneurship – by Peter Drucker, Harper Collins
3. Technology Entrepreneurship Taking Innovation to the Marketplace – by Thomas N. Duening, Robert D. Hisrich and Michael A. Lechter, Elsevier
4. Entrepreneurship Simplified – by Ashok Soota & S. R. Gopalan, Penguin
5. The Design Thinking Playbook: Mindful Digital Transformation of Teams, Products, Services, Businesses and Ecosystems Paperback – Illustrated, 29 June 2018; by Michael Lewrick , Patrick Link, Larry Leifer
6. Bloomsbury Design Thinking Understanding How Designers Think and Work 2019 Edition by Prof. Nigel Cross
7. The Art of Innovation, by Tom Kelley ix. Insight Out, by Tina Seelig x. Change by Design, Tim Brown.

.

Semester- I

Practical

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
I	**DSC-1 P**	**Based on Industrial Chemistry- I**	40	10	50	-	**-**	**2**	2

1.Estimation of Nitrogen by Kjeldahls method.

2.Preparation of p-nitroso N,N- dimethyl aniline.

3.Colorimetric estimation of copper from the given sample.

4.Estimate the amount of chlorine from bleaching powder.

5.Determination of (a) Saponification value of an oil (b) Iodine value of an oil.

6.Determination of viscosity and fluidity of given oil sample (a) edible oil (b) lubricating oil

7. Visit to Textile industry and submission of report.

8. Visit to Chemical and Pharmaceutical industry and submission of report.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
	DSC-2 P	**Based on Industrial Microbiology- I**	40	10	50	-	**-**	**2**	2

1. Introduction and requirement for the Microbiology Laboratory

2. Preparation of culture media and sterilization for the growth of microorganisms

3. Pure culture techniques and Growth of microorganisms

4. Basic staining techniques in microbiology

5. Introduction to the Laboratory scale Fermenter

6. Screening of antibiotic producing microorganism from soil by crowded plate technique

7. Visit to the quality control laboratory and submission of report

8. Visit to the Distillery unit and submission of report

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
	DSE-1.1 P	**Based on Agricultural Biotechnology- I**	40	10	50	-	**-**	**2**	2

1. Screening of *Rhizobium* and PSB from Rhizosperic soil
2. Small scale production of Nitrogen fixing organisms
3. Laboratory scale production of various dairy products
4. Laboratory scale production of various bakery products
5. Laboratory scale production of enzymes
6. Laboratory scale production of sauerkraut
7. Visit to the Biofertilizer production unit and submission of report
8. Visit to the Vasantdada Sugar Industry Manjari Pune or any well-known sugar industry

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
	DSE-1.2 P	**Based on Entrepreneurial Skills -II**	40	10	50	-	**-**	**2**	2

1. To know the concept of price elasticity.
2. To study about planning & decision making.
3. To study laws of variable proportions in industry.
4. To study the methods of pricing in different industries.
5. To study the value and risk analysis of the Commodity/ goods / product in the market.
6. To study the inflation and policy implied by the govt. agency.
7. Visit to Institute / Organization for the study of functioning of office.
8. Presentation / seminar about managerial skills with different case study.
9. Submission of Notes / Summary on Guest Lectures.

M.Sc. I Entrepreneurship

Semester - II

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	DSC-3	Industrial Chemistry - II	80	20	100	4	-	-	4

Unit I: **[15]**

Phosphorus industries: Calcium phosphate, manufacture of phosphoric acid, single and triple super phosphate, baking powder and DAP.

Sulphur and Sulphuric acid: Mining and manufacture of sulphur and manufacture of Sulphuric acid by contact process.

Nitrogen Industries: Ammonia and Manufacture of Urea, calcium cyanamide, ammonium nitrate, nitric acid.

Unit II: **[15]**

Soap

Present status of soap and detergent industries; Raw materials for soap industry and theirselection. Kinetics and Phase reactions in soap boiling. Physico-chemical properties of soap, Plants and Processes employed in soap manufacture. Recovery of by-products, various households and industrial soaps, soap additives, metallic soaps, miscellaneous application of soap-based products, testing and evaluation of soaps.

Synthetic detergents:

Synthetic detergents (anionic, cationic, non-ionic, and amphoteric), detergent additives. Formulations and processing of detergent powders, tablets, liquid and pastes for household and industrial applications. Biosurfactants and enzyme detergents, dry cleaning systems. Bio-degradation of surfactants, Eutrophication and Ecological aspects, Eco-friendly washing systems. Natural saponin based surfactants. Modern trends in detergent formulations, Testing and evaluation of synthetic surfactants.

Unit – III **[15]**

Food Chemistry: Classification, chemical composition and nutritional value of common foodstuffs, properties of foods, food preservation and processing, food deterioration, methods of preservation and processing by heat, cold, chill storage, deep freezing, drying, concentration,

fermentation, and radiation. Food quality; sensory evaluation, objective methods, non-nutritional constituents and food safety.

Unit – IV **[15]**

Paints and Pigments Industries

Paints- Introduction; Classification of paints; Constituents of paints; Formulation of paints; Mixing of paints; Manufacturing processes of paints; Failure of paints; Varnishes, Enamals, Emulsion paints- Constituents. Pigment- Manufacturing processes of zinc oxide and titanium dioxide, properties and application

Dyes

Classification of dyes according to the mode of applications and according to the chemical constitution; Methods of preparation of commercial dyes of different classes with suitable examples; Typical manufacturing processes of dyes; Fluorescent brightening agent.

Reference Books

1. F.A. Henglein: Chemical Technology (Pergamon)
2. R.W. Thomas & P.Farago: Industrial Chemistry (HEB)
3. R.N. Shreve: Chemicals Process Industrial (MGH)
4. Riegel's: Industrial Chemistry (Reinhold)
5. D.S.T: Perspectives in science and technology Vol I & II (Vilas)
6. W.H. Dennis: Foundation of iron and steel metallurgy (Elsevier)
7. Prakash G. More, Comprehensive Industrial Chemistry, Pragati Prakashan, Meerut (Uttar Pradesh)
8. Modern Technology of Soaps, Detergents and Toiletries, P. K. Chattopadhyay
9."Food – The Chemistry of Its Components" by T P Coultate ...
10."Food Processing and Preservation" by B. Sivasanker ...
11."Food Microbiology" by W C Frazier And D C Westhoff ...
12."Modern Food Microbiology" by J M Jay
13. Industrial Chemistry by B K Sharma

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	DSC-4	Microbial & Agriculture Technology - II	80	20	100	4	-	-	4

Unit-I **[15]**

Wine- Industrial production of - Red Table Wine, Sparkling Wine- Champagne, **Beer**- Ale, Lager, Raw materials, Antibiotics**:** Streptomycin, Penicillin, Organic **Acids:** Citric Acid, **Amino acids:** Glutamic Acid.

Unit-II **[15]**

Tissue Culture-Techniques in plant tissue culture, micro propagation, culture of reproductive structures, synthetic seed technology, somaclonal variation, protoplast culture and somatic hybridization, secondary metabolite production, plant tissue culture industry, greenhouse hardening unit operation and management, germplasm conservation.

Unit-III **[15]**

Commercial meat, egg and wool production- Development of practical and economic rations for sheep, goats, pigs, rabbits and poultry. Supply of greens, fodder, feeding regimes for young and mature stock. New trends in enhancing production and management. Feeding and management of animals under drought, flood and other natural calamities, Post harvest technology of agril and horticultural crops.

Unit-IV **[15]**

Production of single cell protein (SCP) - Microorganisms and substrates used, techniques of production, nutritional value of SCP, economics of production, merits and demerits, Mushroom Cultivation System & Farm design, Compost & Composting, Spawn & Spawning, Casting materials & Case running, Cultivation of Button, Oyster and Straw Mushrooms.

Reference Books

1. Wine Science: Principles and Applications, 3rd ed, Ronald S. Jackson, Academic Press
2. Introduction to Wine Laboratory: Practices and Procedures, Jean L. Jacobson, Springer.
3. Principles and practice of winemaking Boltan R. B. (1996) Chapman and Hall.
4. Wine microbiology Science and Technology. Glaudio Delfins& Formica J. V. (2001)
5. Home Winemaking, Young J.O. (1980) Washington State University, Pullman, Washington.
6. Introduction to plant tissue culture- M.K. Razdan
7. Plant tissue culture-Theory & practice-S. S. Bhojwani & M.K. Razdan
8. Plant tissue culture-Kalyankumar Dey
9. Stanbury P. F, Whitaker A. and Hall S. J. (2006). Principles of Fermentation Technology. 2nd edition, Elsevier Science Ltd.
10. Peppler H.J., Perlman D. (2004). Microbial technology-Fermentation Technology, second edition, Volume I and II, Academic Press.
11. Food Microbiology (1995)-Adams M.R.and Moss, M.O., New Age International Limited.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	DSE-2.1	Industrial Chemistry - III	80	20	100	4	-	-	4

Unit I: **[15]**

Metallurgy Industry: Extraction and applications of metal alloys:

a) Iron and steel: Iron, steel alloy, tool steel, stainless steel. b) Aluminum

Cement Industry: Introduction; Classification and Manufacturing processes of Cement and Lime; Setting and Hardening process.

Glass Industry: Introduction; Physical and Chemical properties; Characteristics of glass; raw material Manufacturing process of glass; Ceramic- Raw material, manufacturing process of Whiteware, Glazing.

Unit II: **[15]**

Metal finish technology: Electro refining of metals, electroplating of nickel, chromiumcopper, cadmium, silver and Gold, surface treatment technology, surface coats. Introduction, Electro deposition, electroplating (Factors affecting, requirements and applications), hot dipping, metal cladding, immersion plating, metal spraying, vapor deposition and chemical and organic coating.

Chloralkali Industries: Soda Ash, Caustic Soda, Chlorine

Unit III: **[15]**

Leather Chemistry: Introduction, constituents of animal skin, manufacture and preparation of hides, cleaning, soaking, limiting and degreasing, finishing and sharing, tanning; leather, vegetable, chrome, tanning effluents; pollution and control.

Unit IV: **[15]**

Petrochemicals

Crude oil, Natural gas, Petroleum hydrocarbons- Types and source of crude oil; Refining various petroleum fractions- Thermal cracking, Recycle cracking, Thermal cracking of fuel; outline of chemicals derived from natural gases/ paraffin hydrocarbon-Ethylene, Propylene Butylenes, Benzene, Toluene.

Reference Books

1. Industrial Chemistry by B. K. Sharma
2. Petrochemicals Process Technology by I.D. Mall
3. Industrial Chemistry by R. K. Das Asia Publishing, Mumbai
4. Riegel's Industrial Chemistry
5. Leas Chemistry of Cement and Concrete 1988
6. Industrial Chemistry by A. K. De

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	DSE-2.2	Entrepreneurial Funding	80	20	100	4	-	-	4

Unit No – I **[15]**

Doing Business in India: National Skill Development Corporation (NSDC), National Skill Development Agency (NSDA), Micro Units Development & Refinance Agency Ltd (MUDRA), Annasaheb Patil Arthik Vikas Mahamandal Maryadit, DIC Loan Scheme, Industrial Infrastructure Upgradation Scheme (IIUS) etc.

Unit No – II **[15]**

Fundamental of Accounting: Introduction: Finance, Liquidity and Accountancy: Meaning and scope of Accounting: Need, development and definition of accounting, Branches of accounting, Accounting Standards in India, Concepts, Objectives, Overview of Accounting Standards in India.

Introduction to accounting concepts: Basic concepts: accounts, debits, credit, transactions, assets and liabilities, Types of accounts and rules of Generalizing, Journal and ledger, Trial balance and final Account.

Unit No – III **[15]**

Introduction to Banking and Finance

Evolution of banking, Meaning and definition of bank, Evolution of banking in the West, Evolution of banking in India.

Functions of Bank: -

Primary functions, Secondary functions:

Procedure for Opening of Deposit Account: Know Your Customer Norms (KYC Norms), application form, Introduction, Proof of residence, Specimen signature and Nomination: Their importance. No Frills Account

Procedure for Operating Deposit Account: Pay-in-slips, Withdrawal slips, Issue of pass book, (Current Savings or Recurring deposits), Issue of Cheque book, Issue of fixed deposit receipt, Premature encashment of fixed deposits and loan against fixed deposit. Recurring deposits: Premature encashment and loan against recurring deposit.

Closure of accounts

b) Transfer of accounts to other branches

3.4 Types of account holders

a) Individual account holders- Single or joint, Illiterate, Minor, Married woman, on-resident accounts

b) Institutional account holders- Sole proprietorship, Partnership firm, Joint stock Company, Hindu undivided family, Clubs, Associations and Societies and Trusts.

Methods of Remittances

Demand drafts, bankers' Cheques, Mail transfer, Telegraphic transfer, Electronic Funds Transfer., Promissory note: - Definition, meaning and characteristics, Bill of Exchange and Cheque, Types of Cheques, Types of Crossing- General and Special. Technology in Banking: Need and importance of technology in banking, ATM, Credit card, Debit card, Tele Banking- Net banking, SWIFT (Society for Worldwide Inter- bank Financial Telecommunication), Concept of Core Banking Solution. Wallets and payment banks

Unit No – IV **[15]**

Introduction to software accounting (With reference to Tally current version)

• Creating accounts. • Feeding opening balances. • Chart of accounts: – Capital. – Current assets. – Current liabilities. – Investments. – Loans. – Miscellaneous. – Sales. – Purchase. – Direct / Indirect income / expenses. Purchase and Sales • Purchase / Sales order. • Receipt note. • Purchase / Sales bills. • Debit / Credit note Journal, Voucher, VAT Bills Trial balance and final account • Ledger wise trial balance. • Trading account. • Profit and loss account. Balance sheet. • Outstanding. • Practical work and reports.

Reference Books

1. C.A. Foundation and Intermediate Study Material, ICAI, New Delhi.
2. Sayers – Modern Banking.
3. Robert N Anthony, David Hawkins, Kenneth A. Merchant, Accounting: Text and Cases. McGraw-Hill Education, 13 Ed. 2013.
4. M.C.Vaish - Modern Banking
5. J. R. Monga, Financial Accounting: Concepts and Applications. Mayur Paper Books, New Delhi.
6. M. C. Shukla, T. S. Grewal and S. C. Gupta. Advanced Accounts.Vol.-I. S. Chand & Co., New Delhi.
7. Compendium of Statements and Standards of Accounting. The Institute of Chartered Accountants of India, New Delhi
8. Tannans -Banking Law and Practice in India
9. K.C. Shekhar - Banking Theory and Practice
10. Mithani D.M. - Money Banking International Trade & Public Finance
11. Lordon, Nataranjan- Banking: Theory, Law & Practice
12. S.K.Basu - Current banking Theory & Practice
13. Bhole L.M. (2009), Financial Institutions and Market, Tata McGraw Hill, New Delhi
14. Bhasin Nitin (2010), Financial Institutions and Financial Markets in India: Functioning and Reforms. New Century Publications, New Delhi
15. Berg Braam van den (2015), Understanding Financial Markets & Instruments, Academy of Financial Market, https://eagletraders.com/books/afm/afm4.php
16. Cade, Eddie (1998) Managing Banking Risks, Woodhead Publishing Ltd., in association with The Chartered Institute of Bankers, England.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	DSE-2.3	Business Legislation & IPR	80	20	100	4	-	-	4

UNIT-I **[15]**

The India Contract Act: Essentials of a valid contract, void agreement, performance of contracts, breach of contract and its remedies, Quasi-Contracts.

UNIT-II **[15]**

The Sale of Goods Act: Contract of sale of goods, conditions and warranties, transfers of property, rights of an unpaid seller; the negotiable instruments act; nature and types; negotiation and assignment holder-in due course, dishonor and discharge of a negotiable instrument, arbitration

UNIT-III **[15]**

The Company Act 1956 (Revised Act 2013): Nature and types of companies; formation; memorandum and articles of association; prospectus, shares and share capital, allotment of shares. Membership in Company: Borrowing powers; management and meeting; accounts and audit; compromise arrangements and reconstruction; prevention of oppression and mismanagement; winding up;

UNIT-IV **[15]**

Consumer Protection Act 1986 and Cyber Law and IPR, Patent, trade mark etc.

Reference Books

1) Elements of Mercantile Law: N. D. Kapoor, Sultan Chand & sons, New Delhi.

2) Mercantile Law: S. S. Gulshan, Excel Book, New Delhi.

3) Legal Environment of Business K. Ashwathappa

4) Law of Contracts Dr. Avtar Singh

5) Law of Sale of Goods Dr. Avtrar Singh

6) Company Law Dr. Avtar Singh, Eastern Book Company, 2015

7) The Companies Act,2013 Lexis Nexis, Second Edition, 2014

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**OJT/In house Project / Internship /Apprenticeship**	Industrial Processing / Working	80	20	100	4	**-**	**-**	4

Semester- II

Practicals

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**DSC-3 P**	**Based on Industrial Chemistry- II**	40	10	50	-	**-**	**2**	2

1. Preparation of Soap.
2. Estimation of Cu & Zn in brass alloy.
3. Estimation of calcium oxide in cement.
4. Preparation and characterization of polymers and paints.
5. Preparation of dyes.
6. Preparation of agrochemicals
7. Visit to agrochemical Industry and submission of report.
8. Visit to Cement Industry and submission of report.

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**DSC-4 P**	**Based on Microbial & Agriculture Technology -II**	40	10	50	-	**-**	**2**	2

1. Laboratory scale production of Wine using grapes/fruits
2. Laboratory scale production of Beer using barley/grains
3. Laboratory scale production of Citric acid using *Aspergillus niger*
4. Laboratory scale production of Penicillin using *Penicillium* species
5. Laboratory scale production of mushroom
6. Study of food preservation methods for egg, meat, fish and products
7. Visit to the food processing industry
8. Visit to the winery/brewery industry

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**DSE-2.1 P**	**Based on Industrial Chemistry-III**	40	10	50	-	**-**	**2**	2

Implant Training for specific module (6 weeks) in the industries like-
(Food/Leather/Beverages/Dyes/Glass/Metal/Agro/Pharma/Dairy/other relevant industry)
In plant training, study should focus following points:
1. Introductory study
2. Production technology
3. Harvesting and packaging
4. Marketing and sale
5. Economics

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**DSE-2.2 P**	**Based on Entrepreneurial Funding**	40	10	50	-	**-**	**2**	2

1. To study procedure of availing funds from DIC loan scheme and Micro Units Development & Refinance Agency
2. To prepare final accounts of a business
3. To study procedure of an opening current account
4. To collect various documents used in banking transactions
5. To study terms used in e –banking system
6. To study procedure of availing loans from commercial banks
7. To study Tally ERP9 – with regards to create company, Journal Entries, Trial Balance, and Final Accounts

Sem	Paper Code	Title of Paper	Marks			L	T	P	Credits
			UA	IA	Total				
II	**DSE-2.3 P**	**Based on Business Legislation & IPR**	40	10	50	-	**-**	**2**	2

1. To Study the Agreement / Contract through observation of Legal document.
2. Collection of Paper cuttings of legal / business news regarding to sale of goods act.
3. To study the important banking related receipts, cheques, vouchers, DD, Pay orders etc. under negotiable instrument act.
4. To study the mandatory documents required for the establishment of company/ firm.
5. Visits to District level consumer forum for knowing the grievances redressal procedure.
6. To study the registration process of IPR & Patents.
7. To submit the write-up on the cyber security with reference to any burning issues in the market.
8. To execute registration process for IPR in case of Idea /process development in any related area of market.
9. To execute registration process for Patent in case of Idea /process development in any related area of industry.

****

Equivalence of Papers

M.Sc. Entrepreneurship (Semester I)			
New Syllabus (w.e.f. from 2023)		**Old Syllabus (w.e.f. from June 2021)**	
Paper	**Title of the Paper**	**Paper**	**Title of the Paper**
Code	Industrial Chemistry- I	HCT1.1 I	Industrial Chemistry-I
DSC-2	Industrial Microbiology- I	HCT1.2	Microbial Technology- I
DSE-1.1	Agricultural Biotechnology- I	HCT1.3	Agricultural Biotechnology- I
DSE-1.2	Entrepreneurial Skills -II	SCT1.2	Entrepreneur Skill- II
RM	Entrepreneurial Research, Innovation & Start up	SCT1.1	Entrepreneur Skill- I
DSC-1 P	Based on Industrial Chemistry- I	HCP1.1	Practical based on Industrial Chemistry-I
DSC-2 P	Based on Industrial Microbiology- I	HCP1.2	Practical based on Microbial Technology- I
DSE-1.1 P	Based on Agricultural Biotechnology- I	HCP1.3	Practical based on Agricultural Biotechnology- I
DSE-1.2 P	Based on Entrepreneurial Skills -II	SCP1.2	Practical based on Entrepreneur Skill- II
M.Sc. Entrepreneurship (Semester II)			
DSC-3	Industrial Chemistry- II	HCT2.2	Industrial Chemistry- II
DSC-4	Microbial & Agriculture Technology -II	SCT2.2	Microbial & Agriculture Technology -II
DSE-2.1	Industrial Chemistry-III	SCT2.1	Industrial Chemistry-III
DSE-2.2	Entrepreneurial Funding	OET2.1	Entrepreneurial Funding and?
DSE-2.3	Business Legislation & IPR	OET2.2	Business Legislation & IPR
OJT/ In house Project /Internship/ Apprenticeship	Industrial Processing / Working	HCT2.1	Industrial Processing- I
DSC-3 P	Based on Industrial Chemistry- II	HCP2.2	Practical based on Industrial Chemistry- II
DSC-4 P	Based on Microbial & Agriculture Technology -II	SCP2.2	Practical based on Microbial & Agriculture Technology -II
DSE-2.1 P	Based on Industrial Chemistry-III	SCP2.1	Practical based on Industrial Chemistry- III
DSE-2.2 P	Based on Entrepreneurial Funding	OEP2.1	Practical based on Entrepreneurial Funding and?
DSE-2.3 P	Based on Business Legislation & IPR	OEP2.2	Practical based on Business Legislation & IPR