

Shivaji University, Kolhapur



Choice Based Credit System (CBCS)

B. Sc. Part III

Sugar Technology Entire

Under Faculty of Science & Technology

(To be implemented from Academic Year 2020-21)

- ❖ Guidelines shall be as per B. Sc. Regular Program
- ❖ Rules and Regulations shall be as per B. Sc. Regular Program except CBCS R. B. Sc. 3 Structure of Program and List of Courses.
- ❖ Preamble :

In India sugarcane becomes industrial crop and sugar industry becomes as integrated cane processing unit wherein sugar, alcohol, energy and allied products are manufactured thus it is needed to provide technologist and scientists to the industry. At present there are two institutes which provide technical education related to the sugar industry. Namely National sugar institute Kanpur which is approved by Govt. of India. Dept. Of Food and Agriculture and Vasantdada Sugar Institute Pune which is approved by state govt of Maharashtra and it is autonomous institute. Both the institutes are providing the education in the faculty of Sugar technology, Sugar engineering, Alcohol Technology, and Instrumentation Engg, in the capacity of Post Graduates Diploma... But in India there is no provision for the Bachelor in Sugar technology. Recently Maharashtra govt. permitted to start such a carrier oriented courses under science faculty, according we are running B.Sc. (sugar technology) course since last five academic years .

❖ Structure of Program and List of Courses are as follows:

CBCS R B. Sc. 3:

i) Structure of B. Sc. Sugar technology Entire

Programme Sem. I & II

Structure – I

SEMESTER – I (Duration – 6 Months)															
Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME							
		THEORY			PRACTICAL			THEORY				PRACTICAL			
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Max	Total Marks	Min	Hours	Max	Min	
1	DSC-ST	2	5	4	2	4	3.2	2	50	100	35	PRACTICAL EXAMINATION IS ANNUAL			
2	DSC-ST	2													
3	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
4	DSC-ST	2													
5	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
6	DSC-ST	2													
7	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
8	DSC-ST	2													
9	AECC-A	2	4	3.2	-----	-----	-----	2	50	50	18				
Total		18	24	19.2	8	16	12.8	-		450					
SEMESTER – II (Duration – 6 Months)															
1	DSC-ST	2	5	4	2	4	3.2	2	50	100	35	As per BOS Guide-lines		50	18
2	DSC-ST	2													
3	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
4	DSC-ST	2													
5	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
6	DSC-ST	2													
7	DSC-ST	2	5	4	2	4	3.2	2	50	100	35				
8	DSC-ST	2													
9	AECC-B	2	4	3.2	-----	-----	-----	2	50	50	18				
Total		18	24	19.2	8	16	12.8	-		450		200			
Grand Total		36	48	38.4	16	32	25.6			900					
• Student contact hours per week : 32 Hours (Min.)						• Total Marks for B.Sc.-I (Including English) : 1100									
• Theory and Practical Lectures : 48 Minutes Each						• Total Credits for B.Sc.-I (Semester I & II) : 52									
• DSC – Discipline Specific Core course : All papers are compulsory.															
• AECC – Ability Enhancement Compulsory Course (A & B)- English															
• Practical Examination will be conducted annually for 50 Marks per course (subject).															
• There shall be separate passing for theory and practical courses.															
(A) Non-Credit Self Study Course : Compulsory Civic Courses (CCC)															

For Sem I: CCC – I : Democracy, Elections and Good Governance
(B) Non-Credit Self Study Course : Skill Development Courses (SDC)
For Sem II: SDC – I : Any one from following (i) to (v)
i) Business Communication & Presentation ii) Event management iii) Personality Development, iv) Yoga & Physical Management v) Resume, Report & proposal writing

ii) Structure of B. Sc. Sugar technology Programme

Sem III & IV

Structure - II

SEMESTER – III (Duration – 6 Months)														
Sr. No.	Course (Subject) Title	TEACHING SCHEME						EXAMINATION SCHEME						
		THEORY			PRACTICAL			THEORY				PRACTICAL		
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Max	Total Marks	Min	Hours	Max	Min
1	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35	PRACTICAL EXAMINATION IS ANNUAL		
2	DSC-ST	2	3	2.4				2	50					
3	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35			
4	DSC-ST	2	3	2.4				2	50					
5	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35			
6	DSC-ST	2	3	2.4				2	50					
7	AECC-C	4	4	3.2	---	---	---			---	---			
	TOTAL	16	22	17.6	12	19.2	24			300	---			
SEMESTER – IV (Duration – 6 Months)														
1	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35		As per BOS Guide-lines	100
2	DSC-ST	2	3	2.4				2	50					
3	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35	100		35
4	DSC-ST	2	3	2.4				2	50					
5	DSC-ST	2	3	2.4	4	6.4	8	2	50	100	35	100		35
6	DSC-ST	2	3	2.4				2	50					
7	AECC- C AECC- D	---	---	---	---	---	---	3	70 30	100	25 10	---	---	---
	TOTAL	12	18	14.4	12	19.2	24				400	---	---	---
		28	40	32	24	38.4	48			700	--	---	300	
• Student contact hours per week : 32 Hours (Min.)					• Total Marks for B.Sc.-II (Including EVS) : 1000									
• Theory and Practical Lectures : 48 Minutes Each					• Total Credits for B.Sc.-II (Semester III & IV) : 52									
• DSC : - Discipline Specific Core Course : All papers are compulsory.														
• AECC - Ability Enhancement Compulsory Course (C) : Environmental Studies: EVS (Theory – 70 & Project – 30 Marks)														

- Practical Examination will be conducted annually for 100 Marks per course (subject).
- *There shall be separate passing for theory and practical courses also for Environmental Studies.*

iii) Structure of B. Sc. Sugar Technology Programme

Sem V & VI

Structure - III

SEMESTER – V (Duration – 6 Months)														
Sr. No.	Subject Title	TEACHING SCHEME						EXAMINATION SCHEME						
		THEORY			PRACTICAL			THEORY				PRACTICAL		
		Credits	No. of lectures	Hours	Credits	No. of lectures	Hours	Hours	Theory	Internal	Min Marks	Hours	Max Marks	Min Marks
1	DSE-E	2	3	2.4	8	20	16	2	40	10	14+4=18	PRACTICAL EXAMINATION IS ANNUAL		
2	DSE-E	2	3	2.4				2	40	10	14+4=18			
3	DSE-E	2	3	2.4				2	40	10	14+4=18			
4	DSE-E1/E2/E3	2	3	2.4				2	40	10	14+4=18			
5	AECC-E	2	4	3.2				---	---	---	2			
TOTAL		10	16	12.8	8	20	16		200	50	---			
SEMESTER – VI (Duration – 6 Months)														
1	DSE-F	2	3	2.4	8	20	16	2	40	10	14+4=18	As per BOS Guidelines	200	70
2	DSE-F	2	3	2.4				2	40	10	14+4=18			
3	DSE-F	2	3	2.4				2	40	10	14+4=18			
4	DSE-F1/F2/F3	2	3	2.4				2	40	10	14+4=18			
5	AECC-F	2	4	3.2	---	---	---	2	40	10	14+4=18	---	---	---
TOTAL		10	16	12.8	8	20	16		200	50	---			
GRAND TOTAL		20	32	25.6	16	40	32		400	100	--	---	200	
<ul style="list-style-type: none"> • Student contact hours per week : 32 Hours (Min) • Theory and Practical Lectures : 48 Min. Each • DSE- Discipline Specific Elective : All papers are compulsory. Except DSC E1/E2/E3 & DSC F1/F2/F3 • AECC- Ability Enhancement Compulsory Course (E & F) : English • Practical Examination will be conducted annually for 200 Marks. • <i>There shall be separate passing for theory, internal and practical.</i> 														
(A) Non-Credit Self Study Course : Compulsory Civic Courses (CCC) For Sem V: CCC – II : Constitution of India and Local Self Government														
(B) Non-Credit Self Study Course : Skill Development Courses (SDC) For Sem VI: SDC – II: Any one from following (vi) to (x)														
<ul style="list-style-type: none"> • Total Marks for B.Sc.-III (Including English) : 700 • Total Credits for B.Sc.-III (Semester V & VI) : 36 														

vi) Interview & Personal Presentation Skill, vii) Entrepreneurship Development Skill, viii) Travel & Tourism, ix) E-Banking & Financial Services, x) RTI & Human Right Education (HRE), IPR & Patents

CBCS B. Sc. : Sugar technology Entire : List of courses:

i) B. Sc. Part 1 (Sem. I & II)

Course code	Name of Course	Course code	Name of Course
Sem I		Sem II	
DSC ST1	Applied Chemistry – I (Sugar chemistry)	DSC ST9	Applied Chemistry – II (Organic chemistry)
DSC ST2	Applied Chemistry – I (Bio chemistry)	DSC ST10	Applied Chemistry – II (Physical chemistry)
DSC ST3	Applied Physics-I (Properties of Material & Thermodynamics)	DSC ST11	Applied Physics-II (Basic Instrumentation)
DSC ST4	Applied Physics-I (Optics & Crystallography)	DSC ST12	Applied Physics-II (Sugar Instrumentation)
DSC ST5	Applied Maths-I (Algebra & Geometry)	DSC ST13	Applied Maths-II (Descriptive statistics)
DSC ST6	Applied Maths-I (Differential Integration & calculus)	DSC ST14	Applied Maths-II (Probability Theory)
DSC ST7	Sugarcane Agriculture– I (Sugar cane Agronomy)	DSC ST15	Sugar manufacturing– I (Clarification)
DSC ST8	Sugarcane Agriculture– I (Sugar cane Pathology)	DSC ST16	Sugar Manufacturing– I (Evaporation)
AECC – A	English – I	AECC – B	English – II

Practical

DSC STP1	Applied Chemistry I & II	DSC STP3	Sugar Cane Agriculture –I & Sugar Manufacturing-I
DSC STP2	Applied Physics I & II	DSC STP4	Applied Maths I & II

DSC ST:- Discipline Specific Core Course Sugar Technology

AECC:- Ability Enhancement Compulsory Course: Compulsory English

ii)B.Sc. Part 2 (Sem III & IV)

Course code	Name of Course	Course code	Name of Course
Sem III		Sem IV	
DSC ST17	Sugar Engineering-(Mill House)	DSC ST23	Chemical Engineering-(Heat & Moment Transfer)
DSC ST18	Sugar Engineering-(Boiler & Turbine)	DSC ST24	Chemical Engineering-(Unit Operation)
DSC ST19	Sugar manufacturing: II (crystallization)	DSC ST25	Capacity Calculation-(Clarification)
DSC ST20	Sugar Manufacturing: II (Centrifugal)	DSC ST26	Capacity Calculation-(Evaporation & Crystallization)
DSC ST21	Equipment Design-(Clarification)	DSC ST27	Chemical Control-(Mill House)
DSC ST22	Equipment Design-(Evaporation & Crystallization)	DSC ST28	Chemical Control-(Boiling House)
AECC – C	Environmental Studies (Theory)	AECC – D	Environmental Studies (Project)

AECC-C :- Ability Enhancement Compulsory Course: Environmental Studies

Practical

DSC STP5	Sugar manufacturing	DSC STP7	Chemical control
DSC STP6	Sugar Engineering		

iii) B. Sc. Part 3 (Sem V & VI)

Discipline Specific Elective (DSE)

Course code	Name of Course	Course code	Name of Course
Sem V		Sem VI	
DSE ST29	Process Instrumentation & Control: I	DSE ST33	Allied Sugar Manufacturing
DSE ST30	Process Instrumentation & Control :II	DSE ST34	Allied Co Product Manufacturing
DSE ST31	Advanced Sugar Technology	DSE ST35	E1:Alcohol Technology: I, E2:Water Management in Cogen: I, E3:Buisness Management and Marketing: I
DSE ST32	Advanced Sugar Engineering	DSE ST36	F1:Alcohol Technology: II, F2:Water Management in Cogen: II, F3:Buisness Management and Marketing: II
AECC – E	English – III	AECC – F	English – IV

Practical

DSC STP8	In plant Training & Viva (Project Report)
DSC STP9	Technical Essay (Self Study)

B.Sc. III (Sugar Technology) Sem. - V
Syllabus for Process Instrumentation & control – I
Credit - 1
(Mill Section)

[15]

- a) Auto cane feed control system
Introduction, Need & scope, Classification, Functional elements, Calibration
- b) Imbibitions water flow rate & temperature control system
Introduction, Need & scope, Classification, Functional elements, Calibration
- c) Central lubricant control system
Introduction, Need & scope, Classification, Functional elements, Calibration
- d) Mill drive section
Thyristor Controlled Variable speed D.C. Drives, Thruster Converter Station
(Digital type)

Credit – 2

(Boiler section)

[15]

- a) DCS for boiler control
Introduction, need and scope, classification, level measuring instruments, flow measuring instruments, flow diagram
- b) fly ash control system
Introduction, need and scope, construction and working, flow diagram.
- c) Turbine section
DCS for turbine control, Introduction, need and scope, Flow diagram, Construction and working, Advantages.

**B.Sc. III (Sugar Technology) Sem. - V
Process Instrumentation & Control - II**

Credit – 1

[15]

- a) Auto pan control system.

Introduction, Need & scope, Vacuum control system, Super saturation, control system, Feed control system, Flow diagram , Working

b) Auto molasses conditioning system

Introduction, Need & scope, Brix control system , Temperature control system, Working

c) Brix & temperature control system for melter

Introduction, Need & scope, Brix control system, Temperature control system, Working

d) Auto feed control of centrifugal feed.

Introduction, Need & scope, Flow control, advantages, Working

e) Auto super heated wash system for centrifugal

Introduction, Need & scope, Temperature & pressure control, advantages, Working

Credit - 2

[15]

a) DCS System for centrifugal operation

Introduction, need and scope, Masecuite charging control, Screen & sugar wash control, Sugar discharging control, flow diagram

b) Automatic weighing , numbering and bagging system

Introduction, need and scope, Advantage

c) Computer software development for Daily, weekly, monthly yearly report

Introduction, need and scope, Advantage

Reference Book:

1) Hand book of sugar engineering By- H. Eugot

2) Industrial automation –process control & instrumentation- By S. Medida

3) The complete book on sugar cane processing –chapter 24 By H-panda

4) Instrumentation & automation in sugar industries By - S. S. Engineering.

5) Instrumentation – Shivaji university By Anand M.S.

B.Sc. III (Sugar Technology) Sem. - V

Advance Sugar Technology - I

Credit - 1

[15]

- a) screening of the juice
Effect of bagasillo on manufacturing process, its removal by DSM screen, rotary screen & two stage rotary screens, Advantage of rotary Screen
- b) Juice stabilization & pH control system
On line mass flow meter for juice weighment, Auto pH control system for juice clarification,
- c) New trends in clarification
New trend in juice clarification- filtrate and syrup clarification, Advantages of above both processes
- d) S.R.T
Tray less clarifier or short retention time (S.R.T.) Clarifier, construction and working
- e) Decanter
Muddy juice treatments, construction and working
- f) Sulphur Burner
Film type sulphur burner, Instrumentation and automation for film type sulphur burner.

Credit – 2

[15]

- a) Steam Economy
Vapor bleeding and steam economy, Basic requirement of steam, Steam requirement when vapor are used for entire juice heating, Steam requirement when vapor are used for juice heating and pan boiling, On line conductivity measurement of condensate water, Flashing of condensate, Different steam saving device used in sugar industries
- b) Pan Automation
Pan boiling instrumentation and automation system for batch and continuous pan, Automatic Brix and temperature measurement of molasses conditioner, Automatic Brix and temperature measurement of melter
- c) Centrifugal control
Auto feed control system for centrifugal, Wash water system for centrifugal,

B.Sc. III (Sugar Technology) Sem. - V

Advance Sugar Engineering - II

Credit – 1

[15]

- a) Mill Efficiency
Various factors affecting milling capacity and efficiency
- b) Mill control
Auto cane feeding control system for uniform feed rate, Automatic imbibitions water flow and temperature control system, Central lubricant system
- c) Pressure feeding system
TRPE.GRPF.UFR
- d) Two roller mill

Credit – 2

[15]

- a) Cane diffuser
Heat and mass balance in cane diffuser, construction and working of the diffuser, comparison of cane diffuser with mill
- b) Co-generation of surplus power and its potential.
- c) power saving device
A.C.VFD drive
Planetary gearbox
- d) Heat recovery unit
Flash recovery system, condensate heat recovery system, H.P heater for High pressure boiler, vapcon system, sulphur burner
- e) Boiler water Treatment
Boiler Feed Water Treatment Plant, chemical treatment system

Reference Books:

- 1) Hand book of sugar engineering By-H.Eugot
- 2) Hand book of cane sugar By-R.B.L.Mathur
- 3) Cane sugar engineering By-Peter Rein
- 4) Machinery and equipments of cane sugar factory- By Tromp.

B.Sc. III (Sugar Technology) Sem. - VI

Allied Sugar Manufacturing-I

Credit – 1

[15]

a) Manufacturing of raw sugar

Clarification process, Crystallization process, Centrifugal process

b) Manufacturing of Jaggery & Jaggery powder

Extraction & clarification of juice, Concentration of juice to rab, Drying & packing of Jaggery, Crystallization process of Jaggery powder, Curing, Drying and packing of Jaggery powder

Credit – 2

[15]

a) Manufacturing of refine sugar

Types of refineries, Mingling and affination process, Clarification of refine melt
Evaporation & crystallization, Specification of refine sugar

b) Manufacturing of Khandsari sugar

Specification of Khandsari sugar, Extraction & clarification of cane juice,
Open pan boiling system, Purging, drying & packing system

Reference Books

1) Hand book of sugar refinery By chung chi chou

2) Manufacture & refining of raw sugar By-v.e.Baikow

B.Sc. III (Sugar Technology) Sem. VI

Allied Sugar Co – Products -II

Credit – 1

[15]

a) Molasses

Composition of molasses, storage of molasses, Quality of molasses –pre clarification of molasses, Molasses for production of alcohol process, Molasses for production of yeast process, Molasses for production of acetone process, Molasses for production of glycerin process, Molasses for production of cattle feed process, other use of molasses in different countries

b) Production of ethanol from cane juice

Credit – 2

[15]

a) Bagasse

Composition of bagasse, storage of bagasse, Separation of pith from bagasse, Production of pulp and paper from bagasse process, Production of particle board and fiber board from bagasse process, Production of corrugated boards and boxes from bagasse process, Production of furfural from bagasse process, Production of xylitol from bagasse process, Production of plastic from lignin in bagasse process, Production of methane & product gas from bagasse process, Production of cattle feed from bagasse process, Other use of bagasse and bagasse ash, Generation of surplus power from bagasse

b) Press mud (filter cake)

Composition of filter cake, Use of filter cake as fertilizer process, Use of filter cake for production of cane wax process, Use of filter cake for production of bio-gas process, Use of filter cake as fuel process, Use of filter cake as cattle feed process

Reference Books:

- 1) Ethanol & distillation by H.C. Barron
- 2) The book on sugarcane processing & by-products of molasses – H. Panda.
- 3) Process synthesis for fuel ethanol production - C.A. Cardona.
- 4) Kale U.M
- 5) (1990) glance at distillery by-products DSTA 40th convention.

[15]

- a) Water
Water properties & nature, Source of water, Uses of water & basic chemistry,
Water related table
- b) Treatments
Filtration, Clarification, Oxidation, Chlorination, De-aeration
- c) Ion –exchange method
Softner, De-alkalization, Demineralization application & limitation, Resin

Credit – 2

[15]

- a) Membrane technology
Ultra filtration, Nano filtration, Reverse osmosis, Electro-dialysis
- b) Boiler water treatments
Feed water treatment, Condensate treatment, Boiler water treatment, Boiler
blow down, Reasons of boiler failures, Boiler preventive maintenance, tubes
internal chemical cleaning, Boiler feed & boiler water treatments, Boiler water
limits, Carryover & priming in boiler.

B.Sc. Part III Semester VI
Water Management in Co-generation Plant-II
Credit – 1

[15]

- a) Cooling tower & cooling water treatments
Need of cooling tower, Classification of cooling tower, Cooling tower maintenance, Cooling tower technical definition & calculations, Treatment of cooling water (physical & chemical), Problem in cooling water treatments
- b) Analytical methods & lab equipments
Recommended analytical methods, Recommended analytical equipments, Composition of reagents, Expression & interpretation of analytical result

Credit – 2

[15]

- a) Analysis of
Raw water, clarifier water, filter water, soft water, ultra filtration water, R.O. water, D.M. Water & mixed bed water
 - i) Make up and recalculating water
- b) Automation and Instrumentation for safety working at
Water treatment, Effluent treatment, In plant control method, Environment acts and guide line
- c) Air pollution
Source & control equipments

Reference Books:

- 1) Efficient management in sugar industries by Mangal singh
- 2) Geoeconomical study of waste water management of sugar industries by-S. A. Manglekar
- 3) Ge betz hand book
Nalco water treatments
Albtros hand books
Appa Awha hand book

B.Sc. Part III Semester VI

Alcohol Technology - I

Credit – 1

[15]

- a) Cane molasses
Composition of molasses, gradation of molasses, storage of molasses, factors responsible for reducing the ratio (F/NF) of molasses, other use of molasses
Definition of Molasses, Total reducing sugar, Fermentable/Unfermentable sugar, Residual sugar
- b) Wort, Brix, Specific gravity, Distillation, Industrial alcohol, Proof spirit, Strength of \sprit, Reflux, Vaporization, Saccharification, Scaling, Scrubber, Starch, sucrose, Rectification, Gelatinization, liquefaction, Re-boiler

Credit – 2

[15]

- a) Applied microbiology
Definition of yeast, Taxonomy of yeast, Morphology of yeast, type of micro-organism, Common strain of yeast used for alcoholic fermentation, Growth requirement of yeast, Yeast structure & function of cellular components, Metabolic pathway of yeast, Alcoholic pathway Glycolysis of EMP pathway
- b) Definition & type of fermenter
Traditional batch, fed batch & continuous fermentation, Difference between batch & continuous fermentation, Alcohol production from sweet sorghum, Alcohol production from cane syrup
- c) Propagation of pure yeast culture
Isolation of yeast, preservation of yeast cell, Preservation of pure culture on agar salt, Preparation of slant, purpose of propagation, Fundamental of yeast growth (Aerobic & Anaerobic), Crab tree effect, Growth kinetics, Significance of growth curve, lag phase, log phase, stationary phase, death phase etc. Propagation stages & aspartic condition

Credit – 1**[15]**

a) Types of distillation process.

Atmospheric distillation, MPR distillation, MPR benefits of vacuum distillation, RS, ENA production/Production of anhydrous alcohol, Dehydration with molecular sieve process & membrane process

b) Distillation equipments

Columns, design & construction, maintenance, Types of trays, Types of condenser, Types of Re-boilers

Credit – 2**[15]**

a) Effluent treatment system in Distillery,

Quality of effluent, IS specification of effluent, Biological treatments, Aerobic treatments, Anaerobic treatments

b) Manufacturing of Methane gas % composting, Raw material requirement of biogas plant, Design & capacity of biogas plant, Moisture free methane generation, Types of composting & their production, Factors affecting composting process, Economics consideration in composting process

Reference book:

1) Hand book of alcohol technology by S. V. Patil

2) Industrial alcohol technology hand book by NPCS Board of consultant & engineer

B.Sc. Part III Semester VI**Business management & marketing-I****Credit – 1****[15]**

a) Introduction

Nature of sugar & allied industries, Flow diagram of sugar manufacturing process from cane, Flow diagram of alcohol production from molasses, Flow diagram of power generation from bagasse, Flow diagram of compost from press mud, Flow diagram of ethanol production from alcohol, Flow diagram of methane from spent wash

b) Manufacturing cost of sugar and allied products

Raw material cost, Harvesting & transport cost, Repairing and maintenance cost, Chemical cost, Store consumption cost, packing cost, selling cost, distribution & adm. . . Expenses, Audit system

Credit – 2

[15]

a) Financial cost

Promoters contribution, Govt. contribution, loans from Bank, Govt. subsidy, Tax credit and refunds Working capital

b) Managements

Need, sources and determinants setting of sugar industry, Construction of new sugar factory in Public, Private, Co-operative & Govt. undertaking field Selection of location ,licensing norms for aerial distance, market survey of sugar, Environment clearance, Public hearing ,industrial licensing, govt. related policies

B.Sc. Part III Semester VI

Business Management & Marketing – II

Credit – 1

[15]

- a) Statutory laws applicable to sugar & allied
Essential commodities acts 1955, Sugar control order -1966, Sugar cane control order -1966, Levy sugar supply order-1979 Sugar packing and marketing order - 1970, Sugar developments funds rule - 1983, SMP/FRP(statutory minimum price/fair & remunerative price) of sugar cane, SAP (State advisory price) of sugar cane, The amended orders to all above original orders
- b) Labor acts
Grade & scale fixations wage board laws, Gratuity laws, Provident laws, Bonus acts, Factory acts, Service tax acts.
- c) Excise /taxation acts
Central excise duty on sugar, State excise duty on molasses, State excise duty on bagasse and press mud, Energy laws on power, Vat on sugar & by-products, GST tax on sugar & by - products

Credit – 2

[15]

- a) Marketing of sugar & by products
Introduction, Nature, scope & core concept of marketing, Marketing planning process, Marketing segmentation-Meaning, Concept, Benefits & Doubts, Marketing of sugar- levy, free export/import, damage sugar etc., Marketing of by-product, Molasses, Bagasse, Press mud
- b) Global & domestic scenario of sugar
Global production & consumption, Domestic production & consumption, Indian sugar standard, handling and storing of sugar

Reference book-

- 1) Financial management By Ravi Kishor
- 2) Cost accounting By Jawaher lal
- 3) Marketing management By Tapan Panda