6.1 CIRCULAR JACQUARD MACHINES-II

L	T	P
3	-	2

RATIONALE

Diploma holders in knitting technology are required to study knitting machines with jacquard equipments in knitting industry. In order to perform these job responsibilities, knowledge and skills on circular jacquard machines are essential. It is expected that efforts will be made to provide appropriate learning experiences in knitting technology

DETAILED CONTENTS

THEORY

1 Jacquard selecting mechanisms of circular jacquard knitting machines. (16 hrs)

- 1.1 Indirect needle control with fixed control selectors arrangement.
- 1.2 Indirect needle control through pattern drum. (Geometric Mayer Type)
- 1.3 Multiple Disc Pattern Mechanism.
- 1.4 Jacquard Machine With Comb System.
- 1.5 Geometric Unit Selections.
- 1.6 Pattern Wheel Selecting Mechanism & its working and principle.

2 Working of different mechanisms of jacquard machines. (16 hrs)

- 2.1 Different Cams of Four Cam Track Circular machines.
- 2.2 Different types of Chains & their Functions
- 2.3 Wheel or Drum controlling mechanism.
- 2.4 Stop Motion Devices
- 2.5 Yarn changer device/ striper
- 2.6 Yarn Finger technique or Wrap patterning.

3. Cam set of Double Cylinder Garment Length Knitting Machine (SPJ) and its working. Loop formation of double ended latch needle. (06 hrs)

4. Introduction of Specialty fabrics & machines (10 hrs)

4.1 Simple fleecy fabric circular knitting machine

4.2 Three thread fleecy

4.3 Terry (Round plush)

4.4 Jacquard Plush

LIST OF PRACTICALS

1. Assembling and dissembling of cam sets of power circular jacquard machine.
2. Practice on setting of timing and center setting, yarn guides, positive feeder devices and yarn feeders.
3. Practice on setting and working of different types of selecting mechanisms.
4. Practice on drafting of different jacquard designs and applying it on power driven circular jacquard machines.
5. Practice on setting of jacquard design and knitting of fabric on multiple disc pattern machine.
6. Practice on setting of design and knitting of fabric on drum machine.
7. Practice on setting of bird's eye backing in circular jacquard machines.
8. Practice on knitting of terry fabrics on terry machine.
9. Practice on knitting of single jersey self designed fabrics using tuck stitch and miss-knit.
10. Practice on controlling and handling of circular jacquard machines.
11. Practice on preparation of design on graph paper and filling the pattern wheel.
12. Practice on method of fitting pattern wheel and its adjustment on machine and knitting of jacquard fabric.
13. Practice on setting of GSM on machines.
14. Practice on trace the quality assurance pulley (QAP) and set it for giving loop length by adjusting the central stitch length control mechanism.

INSTRUCTIONAL STRATEGY

The teacher should lay emphasis on understanding of basic concepts and various terms used in the subject. Practical exercises will reinforce various concepts. Industrial exposure must be given by organizing visits.

RECOMMENDED BOOKS

1. Knitting Technology by D.J. Spencer; Mahajan Publishers, Ahmedabad.
2. Circular Knitting by Chandrasekhar Iyer; Mahajan Publishers, Ahmedabad
3. Knitting Technology by Ajgaonkar; Sewak Publication, Mumbai

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	34
2	16	34
3	06	12
4	10	20
Total	**48**	**100**

6.2 ADVANCED MACHINES TECHNOLOGY

L	T	P
2	-	3

RATIONALE

Diploma holders have to handle computerized knitting machines in industry. Technology is changing day by day so diploma holders should have knowledge in advance technology available in Knitting Industry. Hence this subject.

DETAILED CONTENTS

THEORY

1	Modern Knitting Machines - Salient features of modern knitting machines.	(02 hrs)
2	Use of electronics and computers in knitting machines.	(01 hrs)
3	Electro-magnet needle selection mechanism	(02 hrs)
4	Adjustment & setting of G.S.M.	(01 hrs)
5	Various features of Computer control Flat Knitting machines.	(02 hrs)
6	Various features of Computer control Circular Knitting machines.	(02 hrs)
7	Cam Set of Computerized Flat Knitting machine.	(03 hrs)
8	Cam Set of Computerized Circular Knitting machine	(03 hrs)
9	Function and advantage of Presser Foot and Sinkers in Computerized Flat Knitting machine.	(02 hrs)
10	Concept of multi carriage and tendem system of computer control flat machines.	(02 hrs)
11	Knitting instructions & machine programming.	(05 hrs)
12	Types of computerized knitting machines both flat and circular.	(02 hrs)
13	Maintenance of computerized knitting machines.	(02 hrs)
14	Quality improvement of Knitted fabric during knitting at different stages.	(02 hrs)
15	How fibre fly can be reduced on circular knitting machines.	(01 hrs)

LIST OF PRACTICALS

1. Demonstration of computerized knitting machine Identification of different parts of computerized knitting machines.
2. Practice on operation and handling of computerized knitting machines.
3. Demonstration of awareness of different stop motions of computerized knitting machine and their operation.
4. Demonstration of cam set of computerized flat knitting machines and needle path different knitting actions during knit, miss, tucking and transferring of needles.
5. Demonstration of cam set of computerized circular knitting machine.
6. Demonstration of the structure of needle bed and the position of knitting elements of computer flat machine.
7. Preparation and loading of design in controller of machine.
8. Practice on setting of stitch quality, length and width of fabric on these machines.
9. Disassembling and assembling of cam carriage of computerized knitting machine.
10. Maintenance of computerized knitting machine.

INSTRUCTIONAL STRATEGY

Use of audiovisual aids should be made to show specialized operations. Expose the students to real life problems. Stress should be given to acquaint the students with relevant industrial practices.

RECOMMENDED BOOKS

1. Knitting technology by D.B. Ajgoankar; Universal Publication
2. Flat Knitting by Samuel Raz; Meisenback, GmbH Bombay Publication.
3. Knitting Technology by David J Spence

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	06
2	01	04
3	02	06
4	01	03
5	02	06
6	02	06
7	03	10
8	03	10
9	02	06
10	02	06
11	05	16
12	02	16
13	02	06
14	02	06
15	01	03
Total	**32**	**100**

6.3 GARMENT MANUFACTURING TECHNOLOGY – II

L	T	P
2	-	4

RATIONALE

Knitted fabric is used in the production of various knitted garments. Knitted fabric require special handling while cutting and stitching. So students should have knowledge of making garments. Hence the subject.

DETAILED CONTENTS

THEORY

1	Methods of producing knitted garments (fully cut, stitch shaped cut, fully fashioned, integral).	(03 hrs)
2	Fully Cut Garments method in detail.	(03 hrs)
3	Cut Stitch shaped Garments method in detail.	(03 hrs)
4	Line and curve effects.	(02 hrs)
5	Common knitted garment collar styles.	(03 hrs)
6	Different types of knitted outerwear garments and their design.	(04 hrs)
7	General study about Linking machine.	(02 hrs)
8	Handling concepts of fabrics and garments with approaches to increase productivity	(03 hrs)
9	Quality control during knitted fabric assembly while spreading, cutting, sewing and final inspection.	(04 hrs)
10	Merchandising- • Definition • Functions of merchandising division • Role and responsibilities of a merchandiser • Different types of buyers • Communication with buyers • Awareness of current market trends • Product development	(05 hrs)

LIST OF PRACTICALS

1. Prepare size charts of various outer wear garments.
2. Drafting layout of a garment and cutting one sample (trial).
3. Drafting of slipovers, pullovers, sports shirts, lady Coaty, pullovers, cardigans, tracksuits, children wears and fashioned style garments of knitted fabrics.
4. Stitching and preparing finishing with machines.
5. Sewing, linking, locking, seaming, & pressing processes of different articles mationed above.
6. Cutting and making up of Pull over, V. Neck, Round neck pullovers.
7. Cutting and making up of Reglan sleeve pullovers, ladies coaty with round neck front open.
8. Practice on board pressing of outer wear garments.

INSTRUCTIONAL STRATEGY

Use of audiovisual aids should be made to show specialized operations. Expose the students to real life problems. Stress should be given to acquaint the students with relevant industrial practices.

RECOMMENDED BOOKS

1. Knitted Clothing Technology by Bracken Berry; Blackwell Publication Ltd.
2. Introduction to Clothing Manufacture by Cooklin
3. Principles of Knitting Outerwear Fabrics and Garments by Reichman,C New York
4. The Technology of Clothing Manufacture by Carr & Latham
5. Pattern Grading for Women's Outerwear by Cooklin

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	10
2	03	09
3	03	09
4	02	06
5	03	10
6	04	12
7	02	06
8	03	10
9	04	12
10	05	16
Total	**32**	**100**

6.4 PROCESS HOUSE MANAGEMENT

L	T	P
4	-	-

RATIONALE

Diploma holders in textile processing are responsible for production, planning and control. He is also required to ensure maintenance of equipment & machine , material handling, safety measures, etc. for better utilization of resources. Hence this subject.

DETAILED CONTENTS

1. Plant Layout (4 hrs)

   - Concept of plant layout
   - Types of layout (process, product and combination type)
   - Factors affecting plant layout

2. Production (10hrs)

   - Types of production-mass production, job production and batch production
   - Material planning and allocation
   - Process planning and process sheet
   - Record keeping regarding men, materials and machine
   - Inventory control: need of inventory control, levels in inventory control.
   - Duty & responsibility of shift incharge

3. Maintenance (4 hrs)

   - Objective and importance of maintenance
   - Types of maintenance-procedures and advantages

4. Material Handling (6 hrs)

   - Importance of material handling in a process house
   - Handling of dyes & chemicals - methods & precautions
   - Benefited systems of handling of processed goods.

5. Accidents & safety measures (6 hrs)

   - Types of accidents-fire, mechanical & chemical accidents
   - Common sources of different types of accidents and their prevention
   - Methods of minimising the accidents in a process house.

6. Cost Estimation (6 hrs)

- Introduction and function of cost estimation
- Estimation procedure
- Elements of cost.

7. Environment Protection (16 hrs)

- Important effluent characteristics- their effect on environment
- Tolerance limit enforced by state Pollution Boards & its purpose.
- Characteristics of process waste streams-process, possible pollutants & nature of waste water
- Methods of disposal of industrial waste (from dye house & print house specially)
- Various methods of effluent treatment
- Design layout & functioning of an effluent treatment plant
- Red listed dyes & chemicals

8. Water Energy (Steam) Source & its conservation (8 hrs)

- Steam and water consumption
- Reutilization of water
- Recovery of chemicals from waste water
- Methods of minimizing water & steam consumption

9. Need & scope of suitable ventilation & lightening system in a process house (4 hrs)

INSTRUCTIONAL STRATEGY

The teacher should lay emphasis on understanding of basic concepts and various terms used in the subject. The teacher is expected to teach all the students the application of this subject area in various fields.

RECOMMENDED BOOKS

1. Art of Dyeing by B.S. Chauhan.
2. Health hazards in a Textile Mill by NITRA.
3. Dye House Management; Colour Publication, Bombay.
4. Modern Textile Management by J.B. Rattan; Abhishek Publication, Chandigarh.
5. Water and Effluents in Textile Mills by ATIRA.
6. Economy, Energy and Environment in Textile Wet Processing by S.S. Trived.

7. Occupational Health and Safety in Textile Mills by Dr. V.A. Shenai; Sevak Publication, Mumbai.
8. Energy Conservation in Textile Wet Processing by Dr. M.L. Gulrajani; Mahajan Publication Pvt. Ltd., Ahemdabad.

SUGGESTED DISTRIBUTION OF MARKS

Sr. No	Time Allotted (hrs)	Marks Allocation (%)
1	4	6
2	10	16
3	4	6
4	6	10
5	6	10
6	6	10
7	16	24
8	8	12
9	4	6
Total	**64**	**100**

6.5 BASICS OF MANAGEMENT

L	T	P
3	-	-

RATIONALE

The diploma holders are generally expected to take up middle level managerial positions, their exposure to basic management principles is very essential. Topics like Structure of Organization, Leadership, Motivation, Ethics and Values, Customer Relationship Management (CRM), Legal Aspects of Business, Total Quality Management (TQM), Intellectual Property Rights (IPR) etc. have been included in the subject to provide elementary knowledge about these management areas.

DETAILED CONTENTS

1. Principles of Management (06 hrs)

   1.1 Introduction, definition and importance of management

   1.2 Functions of Management
   Planning, Organizing, Staffing, Coordinating, Directing, Motivating and Controlling

   1.3 Concept and Structure of an organization

   Types of industrial organization

   a) Line organization
   b) Functional organization
   c) Line and Functional organization

   1.4 Hierarchical Management Structure
   Top, middle and lower level management

   1.5 Departmentalization
   Introduction and its advantages

2. Work Culture (06 hrs)

   2.1 Introduction and importance of Healthy Work Culture in organization

   2.2 Components of Culture

   2.3 Importance of attitude, values and behavior
   Behavioural Science – Individual and group behavior

   2.4 Professional ethics – Concept and need of Professional Ethics

3. Leadership and Motivation (06 hrs)

   1.1 Leadership

a) Definition and Need of Leadership
b) Qualities of a good leader
c) Manager vs. leader

1.2 Motivation

1.2.1 Definition and characteristics of motivation
1.2.2 Factors affecting motivation
1.2.3 Maslow's Need Hierarchy Theory of Motivation

1.3 Job Satisfaction

4. Legal Aspects of Business: Introduction and need (06 hrs)

4.1 Labour Welfare Schemes
a) Wage payment - Definition and types
b) Incentives - Definition, need and types

4.2 Factory Act 1948

4.3 Minimum Wages Act 1948

5. Management Scope in different Areas (12 hrs)

5.1 Human Resource Development

a) Introduction and objective
b) Manpower Planning, recruitment and selection
c) Performance appraisal methods

5.2 Material and Store Management

a) Introduction, functions and objectives of material management
b) Purchasing: definition and procedure
c) Just in time (JIT)

5.3 Marketing and Sales

a) Introduction, importance and its functions
b) Difference between marketing and selling
c) Advertisement- print media and electronic media
d) Market-Survey and Sales promotion.

5.4 Financial Management – Introduction

a) Concept of NPV, IRR, Cost-benefit analysis

b) Elementary knowledge of Income Tax, Sale Tax, Excise duty, Custom duty, Provident Fund

5.5 Maintenance Management

a) Concept

b) Preventive Maintenance

6. Miscellaneous topics (12 hrs)

6.1 Customer Relationship Management (CRM)

a) Definition and Need

b) Types of CRM

c) Customer satisfaction

6.2 Total Quality Management (TQM)

a) Inspection and Quality Control

b) Concept of Quality Assurance

c) TQM

6.3. Intellectual Property Rights (IPR)

a) Introduction, definition and its importance

b) Infringements related to patents, copyright, trade mark

INSTRUCTIONAL STRATEGY

It is observed that the diploma holders generally take up middle level managerial positions, therefore, their exposure to basic management principles is very essential. Accordingly students may be given conceptual understanding of different functions related to management. Some of the topics may be taught using question answer, assignment or seminar method. The teacher will discuss success stories and case studies with students, which in turn, will develop appropriate managerial qualities in the students. In addition, expert lectures may also be arranged from within the institutions or from management organizations. Appropriate extracted reading material and handouts may be provided.

RECOMMENDED BOOKS

1. Principles of Management by Philip Kotler TEE Publication.
2. Principles and Practice of Management by Shyamal Bannerjee; Oxford and IBM Publishing Co, New Delhi.
3. Financial Management by MY Khan and PK Jain, Tata McGraw Hill Publishing Co., 7, West Patel Nagar , New Delhi.
4. Modern Management Techniques by SL Goel; Deep and Deep Publications Pvt Limited , Rajouri Garden, New Delhi.

5. Management by James AF Stoner, R Edward Freeman and Daniel R Gilbert Jr. ; Prentice Hall of India Pvt Ltd, New Delhi.
6. Essentials of Management by H Koontz, C O' Daniel, McGraw Hill Book Company, New Delhi.
7. Marketing Management by Philip Kotler, Prentice Hall of India, New Delhi.
8. Total Quality Management by DD Sharma, Sultan Chand and Sons, New Delhi.
9. Intellectual Property Rights and the Law by Dr. GB Reddy.
10. Service Quality Standards, Sales & Marketing Department, Maruti Udyog Ltd.
11. Customer Relationship Management; A step-by-step approach, Mohamed & Sagadevan Oscar Publication, Delhi.
12. Customer Relation Management, Sugandhi RK, Oscar Publication, Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (hrs)	Marks Allotted (%)
1	06	15
2	06	10
3	06	15
4	06	10
5	12	25
6	12	25
Total	**48**	**100**

6.6 EMPLOYABILITY SKILLS – II

L	T	P
-	-	2

RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. Our diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject to prepare students for employability in job market and survive in cut throat competition among professionals.

DETAILED CONTENTS

1. Oral Practice

i)	Mock interview	(05 hrs)
ii)	Preparing for meeting	(05 hrs)
iii)	Group discussion	(05 hrs)
iv)	Seminar presentation	(05 hrs)
v)	Making a presentation	(12 hrs)

a) Elements of good presentation
b) Structure and tools of presentation
c) Paper reading
d) Power point presentation

6.7 MAJOR PROJECT WORK

L	T	P
-	-	10

RATIONALE

The practical training cum project work is intended to place students for project oriented practical training in actual work situations for the stipulated period with a view to :

i) Develop understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the courses of study.

ii) Develop understanding of subject based knowledge given in the class room in the context of its application at work places.

iii) Develop firsthand experience and confidence amongst the students to enable them to use and apply polytechnic/institute based knowledge and skills to solve practical problems in the world of work.

iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

This practical training cum project work should not be considered as merely conventional industrial training in which students are sent at work places with minimal supervision. This experience is required to be planned and supervised on regular basis by the polytechnic faculty. For the fulfillment of above objectives, polytechnic may establish close linkage with 8-10 relevant organization for providing such an experience. It is necessary that each organization is visited well in advance and activities to be performed by students are well defined. The chosen activities should be such which are of curricular interest to students and of professional value to industrial/field organizations. Each teacher is expected to supervise and guide 5-6 students.

Effort should be made to identify actual field problems as project work for the students. Project selected should not be too complex which is beyond the level of the students. The placement of the students for such a practical cum project work should match with the competency profile of students and the project work assigned to them. Students may be assessed both by industry and polytechnic faculty.

Some of the suggested project activities are given below:

For Spinning group

1. Assessment of yarn realization, expected waste percentage at different stages from a specific trash percentage raw material
2. To prepare a spin plan for a particular count balancing the machines, material and labour
3. Modifications/changes required in the various machines for processing of stapled man made fibres on cotton spinning system

4. Comparison of semi high production and high production card silver on yarn quality and economics of the both
5. Effect of draft distribution and total draft and change in twist on ring spun yarn with respect to productivity and quality
6. Reasons of end breakages, their remedies and analysis in a ring frame machine
7. Effect of odd no of doubling and even no. of doubling on draw fame seiver.

For Weaving Group

1. Graph to fabric (may be in the mill or institute)
2. Mill plan (for certain number of looms)
3. Sample testing
4. Loom efficiency
5. Project fire fighting
6. Reproduction from fabric samples
7. Fabric faults and remedial steps
8. Study of any latest technology/machine related to weaving

For Knitting and Garmenting

1. Study of variation of knitted structures
2. Comparison of different garment manufacturing systems
3. Knitting faults and remedial steps
4. Garment faults and remedial steps
5. Garment Testing
6. Line setting in garment house

A suggestive criteria for assessing student performance by the external (personnel from industry) and internal (teacher) examiner is given in table below:

Sr. No.	**Performance criteria**	**Max.** marks**	**Rating Scale**				
			Excellent	**Very good**	Good	**Fair**	**Poor**
1.	Selection of project assignment	10	10	8	6	4	2
2.	Planning and execution of considerations	10	10	8	6	4	2
3.	Quality of performance	20	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20	20	16	12	8	4
5.	Sense of responsibility	10	10	8	6	4	2
6.	Self expression/ communication skills	5	5	4	3	2	1
7.	Interpersonal skills/human relations	5	5	4	3	2	1
8.	Report writing skills	10	10	8	6	4	2
9.	Viva voce	10	10	8	6	4	2
Total marks		**100**	**100**	**80**	**60**	**40**	**20**

The overall grading of the practical training shall be made as per following table

	Range of maximum marks	Overall grade
i)	More than 80	Excellent
ii)	79 <> 65	Very good
iii)	64 <> 50	Good
iv)	49 <> 40	Fair
v)	Less than 40	Poor

In order to qualify for the diploma, students must get "Overall Good grade" failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented professional training in the same industry and re-evaluated before being disqualified and declared "not eligible to receive diploma ". It is also important to note that the students must get more than six "goods" or above "good" grade in different performance criteria items in order to get "Overall Good" grade.

Important Notes

1. This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.

2. The criteria for evaluation of the students have been worked out for 100 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.

3. The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.

4. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.

The teachers are free to evolve another criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations in such an exhibition. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific industries are approached for instituting such awards.