

**M.D. UNIVERSITY**  
**ROHTAK (HARYANA)**

**SCHEME OF STUDIES &  
EXAMINATION FOR**

**M. TECH.**

**FASHION & APPAREL  
ENGINEERING**

**SECOND YEAR**

**(2012-13)**

**M.D.UNIVERSITY, ROHTAK (HARYANA)**  
**SCHEME OF STUDIES & EXAMINATION FOR**  
**MASTER OF TECHNOLOGY COURSE IN**  
**FASHION & APPAREL ENGINEERING**

**SEMESTER-III – 2012-13**

S.No	Course No.	Subject	Teaching Schedule			Examination Schedule (Marks)				Duration of Exam (Hours)
			L	P	Total	Class Work	Theor	Practical	Total	
	<b>THEORY</b>									
1	MFA 601	Research Methodology & Business Statistics	4	0	4	50	100	0	150	3
2	MFA 603/605	Elective -I	4	0	4	50	100	0	150	3
3	MFA 607/609	Elective -II	4	0	4	50	100	0	150	3
4	MFA 611	Seminar on Advanced Topics	-	3	3	50	-	50	100	3
5	MFA 613	Minor Project	-	4	4	50	-	50	100	3
	<b>PRACTICAL</b>									
6	MFA 615	Advanced Garment Designing and making or Home Fashion	0	2	2	50	0	50	100	4
		<b>TOTAL</b>	<b>12</b>	<b>9</b>	<b>21</b>	<b>300</b>	<b>300</b>	<b>150</b>	<b>750</b>	

**NOTE:**

- The paper setter shall set each theory paper of 100 marks covering the entire syllabus and the same will be evaluated on marks.
- The Sessionals of Theory/Practical Courses shall also be evaluated on the basis of marks.
- The choice of students for any elective shall not be binding on the Deptt. to offer it.

**Elective -I**

MFA – 603: Automation of Apparel Production

MFA – 605:Apparel Production Cad/CAM systems

**Elective – II**

MFA – 607:Computer-aided Pattern Design

MFA – 609:Utility Properties of cloth, materials

### THIRD SEMESTER - 2012-13

#### MFA 601 Research Methodology & Business Statistics

L T/P C  
4 0 4

Class work : 50  
Examination : 100  
Total : 150  
Exam duration: 3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

#### Unit I

**Research:** Definition of research, Applications of research and types, Research process and steps in it, Deductive and inductive reasoning; **Validity**-conclusion, internal, construct and external.

**Literature review**- Need, Procedure- Search for existing literature, Review the literature selected, Develop a theoretical and conceptual framework, Writing up the review,

#### Unit II

**Regression and Correlation:** Significance of the study of correlation, Karl Pearson's coefficient of correlation, Rank correlation coefficient, Method of least squares, Regression Lines, Regression equations of Y and X, Least square parabola, Partial correlation coefficients (Three variables only) Multiple correlation and Regression. Using MS Excel for computing Correlation Coefficient

#### Unit III

##### Statistical Quality Control:

Meaning of Statistical Quality Control, Control charts, namely, X,R,C and p charts. Benefits and limitations of SQC, acceptance sampling, selection of sampling plan. Construction of an OC curve.

Overview of measures of dispersion, random variates, probability distribution and testing of hypothesis.

#### Unit IV

**Introduction to Experimental Designs**, Principles of experimental design, CRD(one way ANOVA), RBD ,Latin Squares. **Factorial design(Two-way ANOVA)** -a discussion. Use of replicates. Numericals based on Fractional design namely,  $2^3$  experiments &  $3^3$  experiments. Compounding in  $2^3$  and  $3^3$  experiments. Split plot and strip plot designs.

#### Reading List

<u>Titles</u>	<u>Name of the Authors</u>
1. Research Methodology	Kumar Ranjit
2.Design and analysis of Experiments	Das & Giri
3.Fundamentals of statistics (Vol-II)	Goon, Gupta & Das Gupta
4.Fundamentals of statistics	Gupta & Kapoor
5.Business Statistics	Gupta & Gupta
6.Business Statistics	Naval Bajpai

## MFA 603      Automation of Apparel Production

L      T/P      C  
4      0      4

Class work    :    50  
Examination   :    100  
Total            :    150  
Exam duration:    3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

### Unit I

Concept of automation: Base subject information, basic terms and definitions from mechanization area and automation area. Energy transfer in kinematic system, drive requests, types of drives, comparison, characteristics, fluid drives, characteristics, comparing, pneumatic drives, air properties as a medium for energy transfer. Hydraulic drives, schematic diagram, powerpacks, Proportional hydraulic system, servo-operated valves, circuits with PAS (power assisted steering). Electric drives, general view, characteristics, powers (outputs).

### Unit II

Automated elements in cutting of textile materials, cutting by water jet .  
Automated elements in clothing production- sewing and ironing process.

### Unit III

Overview of conceptions of “Work Robots” and “Manipulators”. Kinematic of configurations, kinematic couples, application in textile and clothing industry, Effectors of “Work Robots” and “Manipulators”, Vacuum grippers, control grippers, and special grippers of gripping of textile materials.

### Unit IV

Types of driving mechanism of sewing machines, automated sewing machines.

Automation in area of handling and manipulation with textile material in clothing process. Conveyor systems.

## Reading List

<u>Titles</u>	<u>Name of the Authors</u>
1. Automation and Robotics in the Textile and Apparel Industries	Berkstresser, G.A. & Buchanan, E.M.
2. The Technology of Clothing Manufacture	Carr, H. and Latham, B.
3. Introduction to Garment Manufacture	Cheng, C.Y and Yip, S.F
4. Garment Manufacture - Basic Sewing Technology	Lau, K.P. et al.
5. Fusing Technology	Cooklin G
6. Sewing for Fashion Design	Relis, N. & Strauss, G
7. Textile Objective Measurement and Automation in Garment Manufacture	Stylios G.
8. Apparel Manufacturing Handbook	Solinger, J
9. Methods of Joining Fabrics	Crum, R.J

## **MFA 605          Apparel Production CAD/CAM systems**

L	T/P	C
4	0	4

Class work	:	50
Examination	:	100
Total	:	150
Exam duration:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

### **Unit I**

Application of company information systems, ERP, PLM systems and a engineering methods (JIT, MRP, TOC, ?) in aid of control and company process planning. ERP system Helios Orange by LSC International

### **Unit II**

Control and company process planning by means of CIM, General principles of CA (computer aided) systems I. (CAD, CAE, CAP,..), Formats of video date storage, Data interchange among CA systems General principles of CA systems II. (CAM, CAD/CAM, CQM,.. )

### **Unit III**

Application of CA technology in clothing production I. - point of software view  
Application of CA technology in clothing production II. - point of hardware view (principles of digitizer, plotter, scanner, cutter, ..)

### **Unit IV**

Systems for 2D and 3D clothes designing - data communication between 2D CAD AccuMark system and 3D V-Stitcher, evaluation of clothes fitting to body, creation of virtual presentation

Body scanners - MaNescan system, MIT\_MaNescan program, procedure for measuring and evaluation by 3D CAD CATIA program, application of these programs for production of made to order clothes  
Automatic contactless data capture in clothing production - application of RFID and bar codes

### **Reading List**

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1. Automation and Robotics in the Textile and Apparel Industries	Berkstresser, G.A. & Buchanan, E.M.
2. The Technology of Clothing Manufacture	Carr, H. and Latham, B.
3. Introduction to Garment Manufacture	Cheng, C.Y and Yip, S.F
4. Garment Manufacture - Basic Sewing Technology	Lau, K.P. et al.
5. Sewing for Fashion Design	Relis, N. & Strauss, G
6. Textile Objective Measurement and Automation in Garment Manufacture Stylios G.	
7. Apparel Manufacturing Handbook	Solinger, J
8. CAD / CAM in clothing and Textiles	Stephen Gray
9. CAD in clothing and Textiles	W.Aldrich

## **MFA 607          Computer Aided Pattern design**

L	T/P	C
4	0	4

Class work	:	50
Examination	:	100
Total	:	150
Exam duration:		3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

### **Unit I**

Advanced 3D pattern design systems. Application of the MTM method (Made To Measure) for the production of individual and personalized garments.

### **Unit II**

Pattern modification for garment size and fit. A Good basic understanding of the variation in figure shapes and the appropriate pattern modification. Pattern alteration according to the wearer's; bone structure, posture, body size and contour. Measurement pattern deformation. Choosing the material from a pre-defined library and defining your mechanical properties of fabrics for simulation.

### **Unit III**

Theory of design procedures for the automated design of garments using the CAD system PDS Tailor XQ. Using CAD technology for customisation. Design Concept - software for developing templates from 3D shapes. Production of 2D templates from 3D designs for prototyping. The rational way to design clothes and the transition from 2D to 3D images of virtual body.

### **Unit IV**

Computer Graphics - theory, input and output devices, applications, product development. The principle of scanning the surface of the human body using a system MaNescan. Flattening the surface of 3D objects and their applications in the flattening human body surface in a 3D CAD program CATIA.

## **Reading List**

### **Titles**

### **Name of the Authors**

- |  |                                      |
|--|--------------------------------------|
| 1. Computer-Aided Pattern Design and Product Development | <u>Alison Beazley and Terry Bond</u> |
| 2. Fashion Computing: Design Techniques And CAD          | Sandra Burke                         |
| 3. CAD / CAM in clothing and Textiles                    | Stephen Gray                         |
| 4. CAD in clothing and Textiles                          | W.Aldrich                            |
| 5. Computer Aided Design By Gerber Technology            | Amazon.com                           |
| 6. Modaris, Diamino and Justprint for Apparel Design     | Amazon.com                           |

**MFA 609            Utility properties of cloth, materials**

L        T/P        C  
4        0        4

Class work    :    50  
Examination   :    100  
Total            :    150  
Exam duration:    3 hrs

NOTE: Examiner will set 9 questions in total, with two questions from each unit and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each unit

**Unit I**

Characteristics of clothing materials, according to the function of a clothing product. Classification of clothing materials. Clothing materials demands for users and garments producers.

**Unit II**

CSN, ISO standards for evaluation of clothing materials and garments.  
Processing properties of clothing materials. Processing and utility properties of sewing threads evaluating methods

**Unit III**

End-use properties- clothing materials durability, evaluative methods, Extent of care for garments  
End-use properties- aesthetic properties of clothing materials, evaluative methods  
End-use properties- Physiological properties of clothing materials, evaluative methods

**Unit IV**

Clothing comfort, apparent temperatures  
Hand evaluation – subjective and objective methods of hand evaluation  
End-use properties- Special properties of clothing materials for extreme conditions, evaluative methods  
Multifunction and semi-permeable clothing materials, Special protective clothing.

**Reading List**

<u><i>Titles</i></u>	<u><i>Name of the Authors</i></u>
1. Nonwovens-Theory, Process, performance and Testing	Hassan M Behery
2. Testing and Quality Management	V.K. Kothari
3. An Introduction to Quality Control for Apparel Industry	P.V. Mehta,
4. Engineering apparel fabrics and garments	J Fan, and L Hunter
5. Physical testing of textiles	B P Saville
6. Fabric testing	Woodhead Publishers

**MFA 611****Seminar on Advanced Topics**

L	T/P	C
0	3	3

Class work	:	50
Examination	:	50
Total	:	100

**Purpose:** To enable a student to be familiar with Communication skills.

Student is expected to learn

a. How to make a presentation

i. Verbal

ii. Non Verbal

iii. LCD based Power Point

b. How to write a report

i. Abstract

ii. Body

iii. Conclusions

iv. Executive Summary

c. Group Discussion

i. Share the work with a group

ii. Modularization of the work

iii. Shareware Development

d. Communication

i. Horizontal

ii. Vertical

Students will be given a topic of importance and are expected

a. To present the topic verbally in 30 minutes

b. To present the topic as a report in 30 pages



**MFA-613**

**Minor Project**

L-T/P- C  
0 -4 - 4

Term work marks: 100

The term work under this, submitted by the student shall include –

1. Work diary maintained by the student and counter signed by his guide.
2. The contents of work diary shall reflect the efforts taken by candidate for
  - (a) Searching the suitable project work
  - (b) Visits to different factories or organizations
  - (c) Brief report of journals and various papers referred
  - (d) Brief report of web sites seen for project work
  - (e) The brief of feasibility studies carried to come to final conclusion
  - (f) Rough sketches
  - (g) Design calculation etc. etc. carried by the student.

The student has to make a presentation in front of panel of experts in addition to guide as decided by department head.

## MFA 615 Advanced Garment Designing and making or Home Fashion

L	T/P	C
0	2	2

Class work	:	50
Examination	:	50
Total	:	100

Exam duration : 4 hours

Generation of advanced garments with detailed fashion motivations eg. Jackets/Coats, Evening gowns, Maternity wear and functional wear e.g. high visibility apparels, multilayered apparels etc.

or

Home fashion

Designing of bedding textiles including bed linens, pillow covers etc. Quilt designing for strip, pieced and painted quilts. Baby mattresses and quilt designing. Towel designing e.g. tie towels, basin towels etc. Curtain designing e.g. cafe, sarong, belly dancers curtains etc. Hand loom article designing like rugs, bath mats etc.

***Note: Students have to make 4-5 garments/products from designed fabrics of their choice. Garments (menswear/ womenswear /kidswear)/products should be designed based on themes and seasons as projected by likes of the students, which will be assessed by the jury comprising of external experts from Academic Institution/Industry as well as Internal subject tutor(s). Showcasing of garments or products will be done on Dummies/models/display tables/racks supported by a Technical Report.***

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***SEMESTER-IV 2012-13***

S.No	Course No.	Subject	Teaching Schedule			Examination Schedule (Marks)				Duration of Exam (Hours)
			L	P	Total	Class work	Theory	Practical	Total	
1	MFA 602	Dissertation	-	20	20	100	0	400	500	3

**NOTE:**

1. The sessionals of Dissertation shall be evaluated on the basis of grades i.e., A+, A, B, C, D & E
2. The Dissertation shall be evaluated by an examination committee consisting of the Head of the Department, Dissertation supervisor and one external examiner. The evaluation shall be based on the above grades.
3. The grading system is defined at the end of the Scheme of the Studies and Examinations.

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The performance of the students of M.Tech (Fashion & Apparel Engineering) course shall be graded on the basis of percentage of marks and corresponding grades as mentioned below:

A)

<b>Marks</b>		<b>Grades</b>		<b>Marks</b>
85	<	A+	<	100
75	<	A	<	85
60	<	B	<	75
50	<	C	<	60
40	<	D	<	50
00	<	E	<	40

<b>Letter Grades</b>	<b>Performance</b>	<b>Division</b>
A+	Excellent	First
A	Very Good	First
B	Good	First
C	Fair	Second
D	Pass	Third
E	Repeat	Fail

**Note:** The candidate who have passed all the semesters examinations in the first attempt obtaining at least 75% marks in aggregate shall be declared to have passed in the first division with Distinction mentioned in the degree.

B)

Actual percentage of Marks obtained and corresponding grades should be mentioned on detailed marks certificate of student. To obtain `D' grades a student must have secure at least 40% marks in each subject of the semester Examination.

C)

Student who earned an `E' grade or less than 40% marks in any subject shall have reappear in that subject.

**SECOND YEAR**

**FOURTH SEMESTER- 2012-13**

**MFA-602**

**DISSERTATION**

<b>L</b>	<b>T/P</b>	<b>C</b>
	<b>20</b>	<b>20</b>

The student will submit a synopsis at the beginning of the semester for the approval from the project committee in a specified format. Synopsis must be submitted within two weeks. The first defense, for the dissertation work, should be held within two months time. Dissertation Report must be submitted in a specified format to the project committee for evaluation purpose at the end of semester.