ANNEXURE-10

Mandatory Disclosures

The following information shall be given in the information Brochure besides being hosted on the Institution's official Website.

The onus of the authenticity of the information lies with the Institution ONLY and not on AICTE.

1. **Name of the Institution**
   GOVERNMENT OF INDIA
   MINISTRY OF TEXTILES
   DEVELOPMENT COMMISSIONER (HANDLOOMS)
   INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
   CHOWKAGHAT, VARANASI-221002
   Telephone- 0542-2208329/2203833
   E-Mail- iihtvns@gmail.com

2. **Name and address of the Trust/ Society/ Company and the Trustees**
   Nil

3. **Name and Address of the Vice Chancellor/ Principal/Director**

   Dr. P. Thennarasu
   The Director,
   INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
   CHOWKAGHAT,
   VARANASI – 221002
   Mobile- 06379721264
   E-Mail- pa_thennarasu@yahoo.com

4. **Name of the affiliating University**

   Affiliated to Dr. A.P.J. Abdul Kalam Technical University, Lucknow.

5. **Governance**

   • **Members of the Board and their brief background**

Constituted by the Development Commissioner (Handlooms), New Delhi to formulate policies on the administrative matters of the Institute. The present composition of the Governing Body is the following.

1.	Development Commissioner for Handloom	Chairman
2.	**Addl. Development Commissioner (Handlooms) In-charge of IIHT Convener**	**Convener**
3.	**Director General, NIFT, New Delhi**	**Member**
4.	**Secretary (Handlooms) Govt of West Bengal**	**Member**
5.	**Director (Handlooms) Govt of Tamil Nadu**	**Member**
6.	**Director (Handlooms) Govt of Jharkhand**	**Member**
7.	**Deputy Secretary/Director (Finance), MOT**	**Member**
8.	**Prof. A K Gupta, Deptt. Of Textile Technology, IIT, New Delhi**	**Member**
9.	**Head of Textile Technology, IIT, Delhi**	**Member**
10.	**Representative of All India Counsel of Technical Education Delhi**	**Member**
11.	**Director, IIHT, Jodhpur**	**Member**
12.	**Director, IIHT, Salem**	**Member**
13.	**Director, IIHT, Varanasi**	**Menber**
14.	**Director, IIHT, Guwahati**	**Member**
15.	**Director, IIHT, Bargarh**	**Member**
16.	**Director, IIHT, Fulia**	**Member**
17.	**Principal, SPKM IIHT, Venkatagiri**	**Member**
18.	**Principal, KHTI, Gadag**	**Member**
19.	**Principal, IIHT, Champa**	**Member**
20.	**Executive Director, IIHT, Kannur**	**Member**
21.	**ADC/DDC- In-Charge of IIHTs**	

• **Members of Academic Advisory Body**

ADVISORY BODIES OF IIHTs

Constituted by the Development Commissioner (Handlooms), New Delhi to formulate policies on the administrative matters of the Institute. The present composition of the Governing Body is the following:
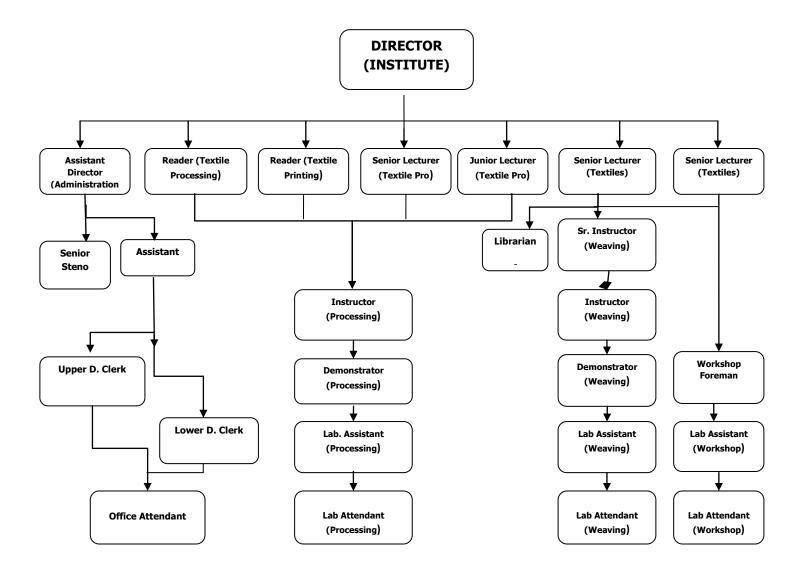
1.	**Dr. Samrat Mukhopadhyay, Associate Professor, Deptt of Textile and Fibre Engineering, IIT Delhi, Chairman**	**Chairman**
2.	**Dr. Vijay Dua, Head of Academic Affairs, NIFT, New Delhi.**	**Member**

No.	Name	Designation
3.	**Dr. Alok Kumar, Professor, IICT, Bhadohi (U.P)**	**Member**
4.	**Dr. Prakash Vasudevan, Director, SITRA, Coimbatore.**	**Member**
5.	**Shri Arindam Basu, Director, NITRA, Ghaziabad, New Delhi.**	**Member**
6.	**Dr. Ravindra D. Kale, Professor, Institute of Chemical Technology, Mumbai.**	**Member**
7.	**Dr. Subhankar Maity, Assistant Professor, Uttar Pradesh Technology Institute, Kanpur.**	**Member**
8.	**Director (Institute), IIHT, Salem.**	**Member**
9.	**Director (Institute), IIHT, Varanasi.**	**Member**
10.	**Director (Institute), IIHT, Jodhpur**	**Member**
11.	**Director (Institute), IIHT, Guwahati.**	**Member**
12.	**Director (Institute), IIHT, Bargarh.**	**Member**
13.	**Director (Institute), IIHT, Fulia.**	**Member**
14.	**Principal, SPKM IIHT, Venkatagiri, A.P.**	**Menber**
15.	**Principal, KHTI, Gadag - Betgeri, Karnataka.**	**Member**
16.	**Principal, IIHT, Champa, Chattisgarh**	**Member**
17.	**Executive Director, IIHT, Kannur.**	**Member**
18.	**Shri M. Balaji, Hantex India, Karur**	**Member (Industry nomination)**
19.	**Shri N. Sundaram, Adventure India, New Delhi**	**Member (Industry nomination)**

• **Frequently of the Board Meeting and Academic Advisory Body**

➢ General body meeting of BOAA is conducted once in a year.
➢ This General body meeting of BOAA consist of two committee –
➢   i) Sub-committee 1   ii) Sub- committee 2
➢ The meeting for the above two committees is conducted twice in a year.

Organizational chart and processes

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                            ┌─────────────────┐
                            │    DIRECTOR     │
                            │   (INSTITUTE)   │
                            └─────────────────┘
```

| Assistant Director (Administration | Reader (Textile Processing) | Reader (Textile Printing) | Senior Lecturer (Textile Pro) | Junior Lecturer (Textile Pro) | Senior Lecturer (Textiles) | Senior Lecturer (Textiles) |

Senior Steno

Assistant

Librarian

Sr. Instructor (Weaving)

Upper D. Clerk

Instructor (Processing)

Lower D. Clerk

Demonstrator (Processing)

Instructor (Weaving)

Office Attendant

Lab. Assistant (Processing)

Demonstrator (Weaving)

Workshop Foreman

Lab Attendant (Processing)

Lab Assistant (Weaving)

Lab Assistant (Workshop)

Lab Attendant (Weaving)

Lab Attendant (Workshop)

• **Nature and Extent of involvement of Faculty and students in academic affairs/improvements**

Different committees have been formed at the institute level with faculty and students as its members to ensure smooth running of the academic affairs.

• Mechanism/ Norms and Procedure for democratic/ good Governance

• **Student Feedback on Institutional Governance/ Faculty performance**

It is available on institute website.

Grievance Redressal mechanism for Faculty, staff and students

Grievance Redressal Committee

1.	Dr. P. Thennarasu	Director	Chairman
2.	Shri Ashok Kumar Singh	Reader (Textile Proc.)	Vice-Chairman
3.	Shri Dillip Kumar Das	Sr. Lecturer (Textiles)	Member
4.	Shri Raju	Asstt. Director (Admn.)	Member
5.	Ms. Vishakha Rawat	Lab Attendant (Proc.)	Member

Establishment of Anti Ragging Committee

Anti-Ragging Committee

1.	Dr. P. Thennarasu	Director	Chairman
2.	Shri Dillip Kumar Das	Sr. Lecturer (Tex.)	Member
3.	Shri Ashok Kumar Singh	Sr. Lecturer (Tex.)	Member
4.	Shri. Raju	Asstt. Director (Admin)	Member
5.	Shri Sunil Kumar Pandey	Asst. Prof.(Textile)	Member
6.	Ms. Shivani Singh	Asst. Prof.(Chemistry)	Member
7.	Sub Inspector	Chetganj Police Station	Member
8.	Ms. Vishakha Rawat	Dy. Warden (Girls Hostel)	Member
9.	A Doctor From SSPG	Doctor, MBBS, MD	Member
10.	Ms. Zigmet Dolkar	5th Sem. DHTT (Girls Student)	Member
11.	Mr. Ravindra Chaurasiya	5th Sem. DHTT (Boys Student)	Member
12	Mr. Bharat Lal	Parent of second year Student	Member
13.	Mr. Sanjeev kr. Singh	Parent of first year student	Member

• **Establishment of Online Grievance Redressal Mechanism**

➢ Available on institute website.

• **Establishment of Grievance Redressal Committee in the Institution and Appointment of OMBUDSMAN by the University**

1.	Shri Ashok Kumar Singh	Reader (Textile Proc.)	Vice-Chairman
2.	Shri Dillip Kumar Das	Sr. Lecturer (Textiles)	Member
3.	Shri Raju	Asstt. Director (Admn.)	Member

4.	**Ms. Anita Devi**	**Assist. Prof. (Textile)**	**Member**

Establishment of Internal Complaint Committee (ICC)

Internal Complaint Committee

1.	**Ms. Jyoti Kumari**	**Asst. Prof.(English)**	**Vice-Chairman**
2	**Shri Dr. Rajnikant Datta**	**Human Welfare Associates, Sarnath**	**Member- NGO**
3.	**Shri Ashok Kumar Singh**	**Sr. Lecturer (Textiles)**	**Member**
4.	**Shri Raju**	**Asst. Director (Admn.)**	**Member**
5.	**Ms. Shivani Singh**	**Asst. Prof.(Chemistry)**	**Member**
6.	**Ms. Anita Devi**	**Assist. Prof. (Textile)**	**Member**
7.	**Jaykant Nirala**	**3rd Sem- B.Tech**	**Member**
8.	**Jeetesh Kumar Verma**	**Ist Sem- B.Tech**	**Member**
9.	**Mayank**	**2nd Sem- PDTP**	**Member**
10.	**Vaishnavi**	**6th Sem- DHTT**	**Member**
11.	**Nitesh Rai**	**4th Sem- DHTT**	**Member**
12.	**Rishu Kumar**	**2nd- Sem DHTT**	**Member**

• Establishment of Committee for SC/ST

COMMITTEE FOR SC / ST			
2	**Shri Raju**	**Asstt. Director (Admn.)**	**Member**
3	**Shri Dillip Kumar Das**	**Sr. Lecturer (Tex.)**	**Member**
4	**Ms. Anita Devi**	**Assist. Prof. (Textile)**	**Member**
5	**Shri Om Prakash**	**Instructor (Wvng.)**	**Member**
5	**Shri Gyan Prakash**	**Workshop Foreman**	**Member**

• Internal Quality Assurance Cell

1.	**Shri P. Chandra**	**Reader (Tex. Proc.)**	**Vice-Chairman**
2.	**Shri Ashok Kumar Singh**	**Sr. Lecturer (Tex.)**	**Member**
3.	**Shri Dillip Kumar Das**	**Sr. Lecturer (Tex.)**	**Member**

| 4. | Mr. Raj Gupta | 5th Sem - DHTT | General Secretary |
| 5. | Shri Devansh Mishra | 3rd Sem - DHTT | Assistant General Secretary |

6. Programmes

• **Name of Programmes approved by AICTE**

➢ Diploma in Handloom & Textile Technology (DHTT)
➢ Post Diploma in Textile Processing (PDTP).
➢ B.Tech in Handloom & Textile Technology **, B.Tech.(HTT)**

Status of Accreditation of the Courses

NBA Accreditation Status

1	Name/ List of Programme/ Courses Accredited –	Nil
2	Applied for Accreditation –	No
	A. Applied but Visit not happened-	
	B. Visit happened but result awaited-	
3	List of programme/ courses Not Applied-	Diploma , Post Diploma & UG Program

NAAC Accreditation Status

1	Accredited –	Nil
2	Applied for Accreditation –	No
	A. Applied but Visit not happened-	
	B. Visit happened but result awaited-	
3	Not Applied-	Diploma , Post Diploma & UG Program

• **Total number of Courses**- Three

➢ Diploma in Handloom & Textile Technology (DHTT)
➢ Post Diploma in Textile Processing (PDTP).
➢ B.Tech in Handloom & Textile Technology **, B.Tech.(HTT)**

• **No. of Courses for which applied for Accreditation**- Nil

• **Status of Accreditation – Preliminary/ Applied for SAR and results awaited/ Applied for SARand visits completed/ Results of the visits awaited/ Rejected/ Approved for . . .Courses (specify the number of courses).--- Nil**

➢ **Name of programmes conducted at IIHT, Varanasi:-**

1. **DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY**

Number of seats- The states under the jurisdiction of the institute and the allotment seats in respect of the Diploma Course are as follows:

S. No.	Name of the State	No. of Seats Allotted
1	Uttar Pradesh	49
2	Himachal Pradesh	06
3	Jammu & Kashmir	08
4	Uttarakhand	06
5	Ladakh	03
	TOTAL	**72**

• **Duration**– 3 Years duration (6 Semester) with an intake of 65.

• **Cut off marks/rank of admission during the last three years**
Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at the Institute.

Age Limit: The age of candidate should be between 15 – 23 years and for SC/ST candidate, age should be between 15 and 25 years as on 1st July every year.

Reservation: The respective State Government will follow their reservation policies for SC/ST/OBC/MBC, etc. In addition to above, Minimum 20% of the total seats allocated to State are reserved for candidates belonging to

Weavers' Community. Short fall will be met out from candidates other than Weavers' Community. (The admission notice for DHTT is released by the respective State Governments.)

• **Fee** (as approved by the state government)

DHTT - FEE STRUCTURE

Sr. No.	Particulars	Amount (in Rs.)
1.	Admission Fee	200
2.	Tuition Fee	4000
3.	Caution Money (Institute)	1000
4.	SRC Subscription and sports Club	2000
5.	ICWF	1000
	Total fee for day scholar (A)	**8200**
	Hostel Fees	
1.	Admission Fees	100
2.	Hostel Rent	3000
3.	Caution Deposit (Hostel)	10000
	Total Fees for Hostel (B)	**13100**
	Total Fees for hostlers(A+B)	**21300**

2. POST DIPLOMA IN TEXTILE PROCESSING

Number of seats: 20

➢ **Educational Qualification:** A candidate having three years Diploma in Handloom Technology / Diploma in Handloom & Textile Technology / Diploma in Textile Technology / Textile Chemistry / Textile Processing from a recognized Institute.

<div align="center">or</div>

Any Science Graduate from a recognized college / University

<div align="center">or</div>

B.Sc. in Home Science passed with Physics & Chemistry subject at 10+2 / Intermediate level.

- ➢ **Admission Process:** Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at the Institute.

- ➢ **Reservation:** 27%, 15% & 7.5% seats will be reserved for OBC, SC & ST Candidates respectively.(The admission notice for PDTP is released by the Central Government.)

- ➢ **Duration**: - 1½ years duration (3 semesters) with an intake of 18
- ➢ **Fees Structure:** -

PDTP - FEE STRUCTURE

Sr. No.	Particulars	Amount (in Rs.)
6.	Admission Fee	300
7.	Tuition Fee	6000
8.	Caution Money (Institute)	1500
9.	SRC Subscription and sports Club	2000
10.	ICWF	1000
	Total fee for day scholar (A)	**10800**
	Hostel Fees	
4.	Admission Fees	100
5.	Hostel Rent	3000
6.	Caution Deposit (Hostel)	10000
	Total Fees for Hostel (B)	**13100**
	Total Fees for hostlers(A+B)	**23900**

3. B. Tech in Handloom and Textile Technology

- ➢ **Number of Seats:** 66

The institute selects candidates from all over India for the admission to B.Tech in Handloom and Textile Technology

- ➢ **Duration:** 4 Years

- ➢ **Fees Structure:-**

B.Tech. (HTT) - FEE STRUCTURE

Sr. No.	Fee Head	AMOUNT (Rs.)			
	Institute fees	1st Year	2nd Year	3rd Year	4th Year
1.	Admission Fee	500	_	__	__
2.	Tuition Fee	8,000	8,000	8,000	8,000
3.	Library Fee	2,000	2,000	2,000	2,000
4.	Laboratory Contingent Charge	2,000	2,000	2,000	2,000
5.	Computer and Internet Charges	2,000	2,000	2,000	2,000
6.	Caution Deposit(Institute)	2,000	----	---	---
7.	Student recreation club (sports, group insurance and extracurricular activities)	2,000	2,000	2,000	2,000
8.	Institutional- cum-welfare fund (ICWF)	1,000	1,000	1,000	1,000
9.	Convocation fees	----	----	----	2,000
	Total fees for day scholar (A)	**19,500**	**17,000**	**17,000**	**19,000**
	Hostel fees				
	Admission Fee	100	---	---	---
	Hostel Rent, maintenance and water charge	3,000	3,000	3,000	3,000
	Caution Deposit(hostel)	10,000	----	----	----
	Total fees for Hostel(B)	**13,100**	**3,000**	**3,000**	**3,000**
	Total fees for Hostellers (A+B)	**32,600**	**20,000**	**20,000**	**22,000**
	AKTU EXAMINATION FEES	The amount as prescribed by the university shall be paid through **Student Dashboard on ERP login**			

- ➢ **Placement Facilities** - Placement Cell is available in the Institute.
- ➢ **Campus placement in last three years with minimum salary, maximum salary and average salary**

CAMPUS PLACEMENT IN LAST THREE YEARS						
Placements for 2018-2019						
S.No.	**Name of Company**	**Selected Candidates**	**Annual Package**	**Minimum Salary**	**Maximum Salary**	**Average Salary**
1.	Vardhman Textiles	4	2.8 Lakh	**1.4 LPA**	**2.8 LPA**	**2.1 LPA**
2.	Faze Three Ltd	10	1.5 Lakh			
3.	Lion Fabric Pvt Ltd	4	1.4 Lakh			
4.	Babu International	4	1.8 Lakh			
5.	Elite Home Decor,	2	1.5 Lakh			
6.	Gold Tex	2	1.4 Lakh			
Placements for 2019-2020						
S.No.	**Name of Company**	**Selected Candidates**	**Annual Package**	**Minimum Salary**	**Maximum Salary**	**Average Salary**
7.	Devgiri Exports	3	1.8 Lakh	**1.8 LPA**	**2.0 LPA**	**1.9 LPA**
8.	Reid & Taylor	1	2 Lakh			
9.	Rivira Textiles	2	1.8 Lakh			
10.	Centex	2	1.9 Lakh			
11.	Bhaskar Denim	2	1.9 Lakh			
12.	C & R Textiles	2	1.8 Lakh			
13.	Kanodia Global Ltd	2	1.8 Lakh			
14.	Om Overseas	1	1.9 Lakh			
15.	Narayan Industries	2	1.8 Lakh			
16.	Shalon Group	1	1.9 Lakh			
Placements for 2020-2021						
S.No.	**Name of Company**	**Selected Candidates**	**Annual Package**	**Minimum Salary**	**Maximum Salary**	**Average Salary**
17.	**Shahi Exports**	3	2 Lakh	**1.8 LPA**	**2.0 LPA**	**1.9 LPA**
18.	**Centex**	2	1.8 Lakh			
19.	**Devgiri Exorts**	2	1.8 Lakh			
20.	**Reed and Pick**	3	1.8 Lakh			
21.	**Elite Home Décor**	1	1.9 Lakh			
22.	**C & R Textiles**	1	1.8 Lakh			
23.	**Abhitex International**	1	1.8 Lakh			
24.	**Raymond Pvt Ltd**	1	2 Lakh			
25.	**Shingora Textiles Ltd**	1	1.9 Lakh			

• **Name and duration of Programme(s) having Twinning and Collaboration with Foreign University(s) and being run in the same Campus along with status of their AICTE approval:**

> ➤ NIL

7. Faculty:

Course/Branch Wise List Faculty members:

Course/Branch	Permanent Faculty	Adjunct Faculty	Permanent Faculty to Student Ratio	Remarks
Bachelor of Technology (Handloom and Textile Technology)	• Dr. P. Thennarasu	1. Dr. N. Srikrishna 2. Dr. Vinay Kumar Chauhan 3. Mr. Mahesh Pratap Dubey 4. Mr. Sunil Kumar Pandey 5. Mr. Saurabh Kumar Gupta 6. Mr. Raj Kumar Yadav 7. Mr. Abhinav Mishra 8. Mr. Manish kumar Srivastava 9. Ms. Jyoti Kumari 10. Ms. Shivani Singh 11. Ms. Neeta Yadav 12. Ms. Anita Devi 13. Ms. Kirti Singh 14. Ms. Nidhi Yadav 15. Mr. Steeve Roy	1:20	
Diploma in Handloom Technology	• Dr. P. Thennarasu • Mr Jitender Tak • Mr. Ashok Kumar Singh • Mr. Dilip Kumar Das	1. Dr. N. Srikrishna 2. Dr. Vinay Kumar Chauhan 3. Mr. Mahesh Pratap Dubey 4. Mr. Sunil Kumar Pandey 5. Mr. Saurabh Kumar Gupta 6. Mr. Raj Kumar Yadav 7. Mr. Abhinav Mishra 8. Mr. Manish kumar Srivastava 9. Ms. Jyoti Kumari 10. Ms. Shivani Singh 11. Ms. Neeta Yadav 12. Ms. Anita Devi 13. Ms. Kirti Singh 14. Ms. Nidhi Yadav 15. Mr. Steeve Roy	1:45	
Post Diploma in Textile Processing	• Dr. P. Thennarasu • Mr. Jitender Tak • Mr. Ashok Kumar Singh • Mr. Dilip Kumar Das	1. Dr. N. Srikrishna 2. Dr. Vinay Kumar Chauhan 3. Mr. Mahesh Pratap Dubey 4. Mr. Sunil Kumar Pandey 5. Ms. Jyoti Kumari 6. Mr. Manish Kumar Srivastava 7. Ms. Nidhi Yadav	1:5	

Number of Faculty employed and left during the last three years:

Number of Faculty employed during the last three years	Number of Faculty left during the last three years
17(Contractual)	01(Permanent, Retired),
01 (Permanent)	07(Contractual)

8(a)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph					
Name		Dr. P. Thennarasu			
Date of Birth		07/01/1968			
Unique ID		1-9320657741			
Education qualification		Ph.D. , M.Tech.			
Work Experience (in Years)		Teaching	Industry	Research	Others
		14	07	05	
Area of specialization					
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/Post Graduate Diploma Level	Diploma	YES			
	Post Diploma	YES			
	Under Graduate	YES			
	Post Graduate				
	Post Graduate Diploma				
Research guidance (No. of Students)					
No. of papers published in National/International Journals/Conferences		03			
Master (Completed/Ongoing)		Completed			
Ph.D. (Completed/Ongoing)		Completed			
Projects Carried Out					
Patents (Filed & Granted)					
Technology Transfer					
Research Publication (No. of papers published in National/International Journals/Conferences)		03			
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)					

8(b)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	**Dr. N. Srikrishna**			
Date of Birth	**28/01/1984**			
Unique ID	**1-4747541317**			
Education qualification	**Ph.D., M. Tech., B.Tech.**			
Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	07	**01**	**06**	
Area of specialization	**Textile Chemistry**			

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**-**
	Under Graduate	**YES**
	Post Graduate	**YES**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**50**
No. of papers published in National/International Journals/Conferences	**8**
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	**Completed**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**8**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(c)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph				
Name		**Dr. Vinay Kumar Chauhan**		
Date of Birth		**23/09/1987**		
Unique ID		**1-10536918308**		
Education qualification		**Ph.D., M. Tech.**		
Work Experience (in Years)		**Teaching**	**Industry**	**Research**	**Others**
		3.8	**2**		
Area of specialization		**Textile Chemistry**		
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**		
	Post Diploma	**YES**		
	Under Graduate	**YES**		
	Post Graduate			
	Post Graduate Diploma			
Research guidance (No. of Students)		**03**		
No. of papers published in National/International Journals/Conferences		**13**		
Master (Completed/Ongoing)		**Completed**		
Ph.D. (Completed/Ongoing)		**Completed**		
Projects Carried Out				
Patents (Filed & Granted)				
Technology Transfer				
Research Publication (No. of papers published in National/International Journals/Conferences)		**13**		
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)				

8(d)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	**Mr. Mahesh Pratap Dubey**
Date of Birth	**02/02/1984**
Unique ID	**1-2299915349**
Education qualification	**M.Tech., B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	12			

Area of specialization	**Textile Engineering and Management**

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**YES**
	Under Graduate	**YES**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**04**
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	**-**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**03**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(e)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph				
Name	**Mr. Sunil Kumar Pandey**			
Date of Birth	**05/06/1992**			
Unique ID	**1-10536918301**			
Education qualification	**M.Tech., B.Tech.**			
Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	04	**04**		
Area of specialization	**Textile technology**			
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**		
	Post Diploma	**YES**		
	Under Graduate	**YES**		
	Post Graduate	**-**		
	Post Graduate Diploma	**-**		
Research guidance (No. of Students)	**-**			
No. of papers published in National/International Journals/Conferences	**02**			
Master (Completed/Ongoing)	**COMPLETED**			
Ph.D. (Completed/Ongoing)	**Ongoing**			
Projects Carried Out	**-**			
Patents (Filed & Granted)	**--**			
Technology Transfer				
Research Publication (No. of papers published in National/International Journals/Conferences)	**02**			
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**			

8(f)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph				
Name	**Mr. Abhinav Mishra**			
Date of Birth	**05/04/1994**			
Unique ID	**1-3570374824**			
Education qualification	**M.Tech., B.Tech.**			
Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	04			
Area of specialization	**Energy Technology and Management**			
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**		
	Post Diploma	**-**		
	Under Graduate	**YES**		
	Post Graduate	**-**		
	Post Graduate Diploma	**-**		
Research guidance (No. of Students)	**-**			
No. of papers published in National/International Journals/Conferences	**-**			
Master (Completed/Ongoing)	**Completed**			
Ph.D. (Completed/Ongoing)	**-**			
Projects Carried Out	**-**			
Patents (Filed & Granted)	**-**			
Technology Transfer	**-**			
Research Publication (No. of papers published in National/International Journals/Conferences)	**--**			
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**			

8(g)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	**Mr. Raj Kumar Yadav**			
Date of Birth	**08/07/1995**			
Unique ID	**1-9535628537**			
Education qualification	**M.Sc., B.Sc.**			
Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	03			
Area of specialization				

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**-**
	Under Graduate	**YES**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**-**
Master (Completed/Ongoing)	**COMPLETED**
Ph.D. (Completed/Ongoing)	**-**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**-**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(h)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	**Mr. Saurabh Kumar Gupta**
Date of Birth	**20/07/1992**
Unique ID	**1-9455239982**
Education qualification	**M.Tech., B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	03			

Area of specialization	**Electronics**	
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**-**
	Under Graduate	**YES**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**03**
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	**--**
Projects Carried Out	**-**
Patents (Filed & Granted)	**--**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**03**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(i)Profile of Vice Chancellor/Director/Principal/Faculty:

<table>
<tr><td rowspan="2">For each faculty give a page covering with passport size photograph</td><td></td></tr>
</table>

Name	**Mr. Manish Kumar Srivastava**
Date of Birth	**10/07/1993**
Unique ID	**1-9454956168**
Education qualification	**M.Sc., B.Sc.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	03			

Area of specialization		

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**-**
	Under Graduate	**YES**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**-**
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	**-**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**-**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(j)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	Ms. Jyoti Kumari
Date of Birth	25/07/1993
Unique ID	1-9478460716
Education qualification	Ph.D.(ongoing), M.A., B.A.

Work Experience (in Years)	Teaching	Industry	Research	Others
	02			

Area of specialization	Indian English Literature

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	Diploma	Yes
	Post Diploma	-
	Under Graduate	Yes
	Post Graduate	-
	Post Graduate Diploma	-

Research guidance (No. of Students)	-
No. of papers published in National/International Journals/Conferences	04
Master (Completed/Ongoing)	Completed
Ph.D. (Completed/Ongoing)	Ongoing
Projects Carried Out	-
Patents (Filed & Granted)	-
Technology Transfer	-
Research Publication (No. of papers published in National/International Journals/Conferences)	02
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	-

8(k) Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	Ms. Shivani Singh			
Date of Birth	04/04/1996			
Unique ID	1-9454956161			
Education qualification	M.Sc., B.Sc.			
Work Experience (in Years)	Teaching	Industry	Research	Others
	04			
Area of specialization	Inorganic Chemistry			

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	Diploma	YES
	Post Diploma	YES
	Under Graduate	YES
	Post Graduate	--
	Post Graduate Diploma	-
Research guidance (No. of Students)		-
No. of papers published in National/International Journals/Conferences		-
Master (Completed/Ongoing)		Completed
Ph.D. (Completed/Ongoing)		-
Projects Carried Out		-
Patents (Filed & Granted)		-
Technology Transfer		-
Research Publication (No. of papers published in National/International Journals/Conferences)		-
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)		

8(l) Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	**Ms. Neeta Yadav**
Date of Birth	**05/11/1994**
Unique ID	**1-4559778782**
Education qualification	**Ph.D. (Ongoing), M.Tech., B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	02			

Area of specialization	**Computer Science & Engineering**

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**Yes**
	Post Diploma	**-**
	Under Graduate	**Yes**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**03**
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	**Ongoing**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**03**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**01, Introduction to IoT Technologies and Its Applications**

8(m)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	**Jitender Tak**
Date of Birth	**15/09/1975**
Unique ID	**1-43442332111**
Education qualification	**B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	14			

Area of specialization	**Textile Processing**

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**Yes**
	Post Diploma	**Yes**
	Under Graduate	**-**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**-**
Master (Completed/Ongoing)	**-**
Ph.D. (Completed/Ongoing)	**-**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**-**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(n) Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	Mr. Dilip Kumar Das
Date of Birth	05/12/1982
Unique ID	1-3189183597
Education qualification	DHTT, AMIE

Work Experience (in Years)	Teaching	Industry	Research	Others
	11	07		

Area of specialization	Textile

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	Diploma	YES
	Post Diploma	-
	Under Graduate	--
	Post Graduate	-
	Post Graduate Diploma	-

Research guidance (No. of Students)	-
No. of papers published in National/International Journals/Conferences	-
Master (Completed/Ongoing)	-
Ph.D. (Completed/Ongoing)	-
Projects Carried Out	-
Patents (Filed & Granted)	-
Technology Transfer	-
Research Publication (No. of papers published in National/International Journals/Conferences)	-
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	-

8(o) Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	**Mr. Ashok Kumar Singh**
Date of Birth	**05/01/1983**
Unique ID	**1-2691718253**
Education qualification	**DHTT, AMIE (Textile Engineering)**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	08	**06**		

Area of specialization	**Textile**	
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**
	Post Diploma	**-**
	Under Graduate	**-**
	Post Graduate	**-**
	Post Graduate Diploma	**-**

Research guidance (No. of Students)	**-**
No. of papers published in National/International Journals/Conferences	**-**
Master (Completed/Ongoing)	**-**
Ph.D. (Completed/Ongoing)	**-**
Projects Carried Out	**-**
Patents (Filed & Granted)	**-**
Technology Transfer	**-**
Research Publication (No. of papers published in National/International Journals/Conferences)	**-**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**

8(p)Profile of Vice Chancellor/Director/Principal/Faculty:

<table>
<tr><td rowspan="2">For each faculty give a page covering with passport size photograph</td><td></td></tr>
</table>

Name	**Ms. Kirti SIngh**
Date of Birth	**25-10-1995**
Unique ID	**1-43443863671**
Education qualification	**M.Tech, B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
		08 months		

Area of specialization	**Textiles & Garments**

Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	-
	Post Diploma	-
	Under Graduate	Yes
	Post Graduate	-
	Post Graduate Diploma	-

Research guidance (No. of Students)	-
No. of papers published in National/International Journals/Conferences	-
Master (Completed/Ongoing)	**Completed**
Ph.D. (Completed/Ongoing)	-
Projects Carried Out	03
Patents (Filed & Granted)	-
Technology Transfer	-
Research Publication (No. of papers published in National/International Journals/Conferences)	-
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	-

8(q)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	
Name	**Ms. Nidhi Yadav**
Date of Birth	**10-10-1994**
Unique ID	**1-43442332163**
Education qualification	**M.Tech, B.Tech.**

Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**
	06 months	**01**		

Area of specialization		
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**-**
	Post Diploma	**-**
	Under Graduate	**YES**
	Post Graduate	**YES**
	Post Graduate Diploma	
Research guidance (No. of Students)		**-**
No. of papers published in National/International Journals/Conferences		**-**
Master (Completed/Ongoing)		**COMPLETED**
Ph.D. (Completed/Ongoing)		**ONGOING**
Projects Carried Out		**-**
Patents (Filed & Granted)		**-**
Technology Transfer		**-**
Research Publication (No. of papers published in National/International Journals/Conferences)		**-**
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)		**-**

8(r)Profile of Vice Chancellor/Director/Principal/Faculty:

<table>
<tr><td rowspan="2">For each faculty give a page covering with passport size photograph</td><td colspan="4"></td></tr>
<tr></tr>
<tr><td>Name</td><td colspan="4">Steeve Roy</td></tr>
<tr><td>Date of Birth</td><td colspan="4">01/10/1997</td></tr>
<tr><td>Unique ID</td><td colspan="4">1-43442332231</td></tr>
<tr><td>Education qualification</td><td colspan="4">M.Tech., B.Tech.</td></tr>
<tr><td rowspan="2">Work Experience (in Years)</td><td>Teaching</td><td>Industry</td><td>Research</td><td>Others</td></tr>
<tr><td>10 months</td><td>02 months</td><td></td><td></td></tr>
<tr><td>Area of specialization</td><td colspan="4">Spinning, Technical Textiles</td></tr>
<tr><td rowspan="5">Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level</td><td>Diploma</td><td colspan="3">YES</td></tr>
<tr><td>Post Diploma</td><td colspan="3">YES</td></tr>
<tr><td>Under Graduate</td><td colspan="3">YES</td></tr>
<tr><td>Post Graduate</td><td colspan="3">-</td></tr>
<tr><td>Post Graduate Diploma</td><td colspan="3">-</td></tr>
<tr><td colspan="2">Research guidance (No. of Students)</td><td colspan="3">-</td></tr>
<tr><td colspan="2">No. of papers published in National/International Journals/Conferences</td><td colspan="3">01</td></tr>
<tr><td colspan="2">Master (Completed/Ongoing)</td><td colspan="3">COMPLETED</td></tr>
<tr><td colspan="2">Ph.D. (Completed/Ongoing)</td><td colspan="3">-</td></tr>
<tr><td colspan="2">Projects Carried Out</td><td colspan="3">-</td></tr>
<tr><td colspan="2">Patents (Filed & Granted)</td><td colspan="3">-</td></tr>
<tr><td colspan="2">Technology Transfer</td><td colspan="3">-</td></tr>
<tr><td colspan="2">Research Publication (No. of papers published in National/International Journals/Conferences)</td><td colspan="3">01</td></tr>
<tr><td colspan="2">No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)</td><td colspan="3">-</td></tr>
</table>

8(s)Profile of Vice Chancellor/Director/Principal/Faculty:

For each faculty give a page covering with passport size photograph	

Name	**Anita Devi**				
Date of Birth	**15-06-1988**				
Unique ID	**1-43442332253**				
Education qualification	**M.Tech., B.Tech.**				
Work Experience (in Years)	**Teaching**	**Industry**	**Research**	**Others**	
	05				
Area of specialization	**Textile Technology**				
Course taught at Diploma /Post Diploma/Under Graduate/Post Graduate/ Post Graduate Diploma Level	**Diploma**	**YES**			
	Post Diploma	**YES**			
	Under Graduate	**YES**			
	Post Graduate	**-**			
	Post Graduate Diploma	**-**			
Research guidance (No. of Students)	**-**				
No. of papers published in National/International Journals/Conferences	**-**				
Master (Completed/Ongoing)	**COMPLETED**				
Ph.D. (Completed/Ongoing)	**-**				
Projects Carried Out	**-**				
Patents (Filed & Granted)	**-**				
Technology Transfer	**-**				
Research Publication (No. of papers published in National/International Journals/Conferences)	**-**				
No. of Book Published with details (Name of the book, Publisher with ISBN, year of publication, etc.)	**-**				

9. Fee

- **Details of Fee, as approved by State Fee Committee, for the Institution**

Name of Programme	S. No.	Institute Fees	1st Year	2nd Year		3rd Year	4th Year
				Regular	Lateral Entry		
Bachelor of Technology (Handloom and Textile Technology)	1.	**Admission Fee**	500	-	500	-	-
	2.	**Tuition Fee**	8,000	8,000	8,000	8,000	8,000
	3.	**Library Fee**	2,000	2,000	2,000	2,000	2,000
	4.	**Laboratory Contingent Charge**	2,000	2,000	2,000	2,000	2,000
	5.	**Computer and Internet Charges**	2,000	2,000	2,000	2,000	2,000
	6.	**Caution Deposit (Institute)**	2,000	-	2,000	-	-
	7.	**Student Recreation Club (Sports, group insurance, extra-curricular activities)**	2,000	2,000	2,000	2,000	2,000
	8.	**ICWF**	1,000	1,000	1,000	1,000	1,000
	9.	**Convocation FEE**	-	-	-	-	2,000
		Total fees	**19,500**	**17,000**	**19,500**	**17,000**	**19,000**
Diploma in Handloom and Textile Technology	1.	**Admission Fee**	200		200		
	2.	**Tuition Fees**	4,000		4,000		
	3.	**Caution Deposit (Institute)**	1,000		1,000		**Not Applicable**
	4.	**SRC Subscription and Sports Club**	2,000		2,000		
	5.	**ICWF**	1,000		1,000		
		Total Fees	**8,200**		**8,200**		
Post Diploma in Textile Processing	1.	**Admission Fee**	300				
	2.	**Tuition Fees**	6,000				
	3.	**Caution Deposit (Institute)**	1,500			**Not Applicable**	**Not Applicable**
	4.	**SRC Subscription and Sports Club**	2,000				
	5.	**ICWF**	1,000				
		Total Fees	**10,800**				

- **Time Schedule for the Payment of the fee for the Entire Programme**
- **No. of Fee Waivers granted with amount and name of students**
- **Number of Scholarship offered by the Institution, duration, and amount**
- **Criteria for Fee Waivers/Scholarship**

Hostel Fee

Name of Programme	S. No.	Hostel Fees	1st Year	2nd Year	3rd Year	4th Year
Bachelor of Technology (Handloom and Textile Technology)	1.	Admission Fee	100	-	-	-
	2.	Hostel Rent, Maintenance and Water Charge	3,000	3,000	3,000	3,000
	3.	Caution Deposit (Hostel)	10,000	-	-	-
	4.	Mess Advance (Hostel) * (x2)	12,500	12,500	12,500	12,500
	5.	Electricity Charge Advance * (x2)	1500	1500	1500	1500
		Total fees	**27,100**	**17,000**	**17,000**	**17,000**
Diploma in Handloom and Textile Technology	1.	Admission Fee	100	-	-	Not Applicable
	2.	Hostel Rent	3,000	3,000	3,000	
	3.	Cation Deposit(hostel)	10,000	-	-	
	4.	Mess Advance (Hostel) * (x2)	12,500	12,500	12,500	
	5.	Electricity Charge Advance * (x2)	1500	1500	1500	
		Total Fees	**27,100**	**17,000**	**17,000**	
Post Diploma in Textile Processing	1.	Admission Fee	100		Not Applicable	Not Applicable
	2.	Hostel Fees	3,000			
	3.	Cation Deposit(hostel)	10,000			
	4.	Mess Advance (Hostel) * (x2)	12,500			
	5.	Electricity Charge Advance * (x2)	1500			
		Total Fees	**27,100**			

*Note: Mess Advance (Hostel) and Electricity Charge advance will be collected on each semester and the same will be adjusted as per the actual bill on monthly basis.

- **Estimated Cost of boarding and Lodging in Hostels**
- **Any other fee please Specify**

10. Admission

- **No. of Seats Sanctioned with the year of Approval**

S. No.	Name of the Programme	No. of Seat Intake
1.	Bachelor of Technology (HTT)	60+6
2.	Diploma in Handloom and Textile Technology (DHTT)	65
3.	Post Diploma in textile processing (PDTP)	20

- **Number of Students admitted under various categories each year in the last three years**

Name of the Programme	Year	Gender	GEN Excluding minority	OBC	SC	ST	EWS	PH	Minority	TOTAL STUDENTS
Diploma in Handloom and Textile Technology (Approved Intake-65), DHTT 1st Year	2018-19	Male	9	14	12	0	0	0	14	66
		Female	5	8	1	0	0	0	3	
	2019-20	Male	9	18	6	0	0	0	13	64
		Female	3	8	4	0	0	0	3	
	2020-21	Male	13	22	5	1	0	0	5	66
		Female	2	9	3	1	0	0	5	
	2021-22	Male	22	13	5	1	0	0	11	69
		Female	5	4	3	0	0	0	5	
	2022-23	Male	12	22	8	2	4	0	6	69
		Female	2	10	0	0	1	0	2	
DHTT 2nd Year Lateral Entry	2022-23	Male	0	4	1	0	0	0	0	06
		Female	0	1	0	0	0	0	0	
Post Diploma in Textile Processing (Approved Intake-20)	2018-19	Male	3	7	1	0	0	0	1	17
		Female	4	1	0	0	0	0	0	
	2019-20	Male	5	7	2	0	0	0	1	17
		Female	1	1	0	0	0	0	0	
	2020-21	Male	2	6	0	0	0	0	0	13
		Female	0	5	0	0	0	0	0	
	2021-22	Male	7	4	0	0	0	0	0	19
		Female	5	2	1	0	0	0	0	
	2022-23	Male	5	5	2	0	1	0	0	15
		Female	0	2	0	0	0	0	0	
Bachelor of Technology (HTT) (Approved Intake-60), B.Tech. 1st Year	2021-22	Male	3	7	0	0	0	0	1	20
		Female	7	1	1	0	0	0	0	
	2022-23	Male	3	8	1	0	2	0	1	23
		Female	0	3	3	0	1	0	1	
B.Tech. (HTT) 2nd Year Lateral Entry	2022-23	Male	1	7	1	0	1	0	0	17
		Female	0	3	3	0	1	0	0	

- **No. of application received during last two years for admission under Management Quota and number admitted**
  There is no provision under Management Seats.

11. Admission Procedure:

(A)   DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY(DHTT) - 3 years duration (6 semesters) with an intake of 65.

Name of Programme	Eligibility
1st Year DHTT	Passed 10th Std./ SSC examination. Obtained at least 35% marks in the qualifying examination with English and mathematics as a subject of study
Direct 2nd year DHTT under Lateral Entry	Should have passed 10+2 examination with Mathematics, Physics, Chemistry OR Should have passed 10+2 examination in vocational stream of any textile discipline* OR 10th Pass + ITI (2 Years) shall be eligible for admission to Second Year Diploma Program*

* The candidates will undergo bridge courses for Mathematics, Physics and Chemistry, offered by IIHT, as per the guidelines.

Note: In case of the Board having system of grading in 10th/12th Examination, the candidate must endorse the proof of details of marks with their application form to enable the selection committee to prepare merit list which is prepared on the basis of marks secured.

1. **Admission Process:**
Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at the Institute.

2. Age limit:
For granting admission in Diploma in Handloom and Textile Technology program, the maximum age limit for the candidates belongs to all categories except SC/ST is 23 years for first year and 25 years for direct 2nd year. In respect of SC/ST candidates the maximum age limit is 25 years for 1st year and 27 years for direct 2nd year as on 01st July 2023.

3. Reservation
   i.   The respective State Governments will follow their reservation policies for SC/ST/OBC & EWS etc.
   ii. In addition to above, minimum 20% of the total seats allotted to the states are reserved for Candidates belonging to Weavers Community. Shortfall if any will be met out from the candidates other than weaver's community.
(The admission notice for DHTT is released by the respective State/UTs Governments)

Stipend: Rs.2500/- per month for First year, second year & Third year to be shared by Central & State Govt. in ratio 50:50. Stipend is payable for 10 months of every Academic session and only upon achieving the qualifying attendance of 80% per month.

(B) **POST DIPLOMA IN TEXTILE PROCESSING – 1½ years duration (3 semesters) with an intake of 18.**

Educational Qualification: A candidate having three years Diploma in Handloom Technology / Diploma in Handloom & Textile Technology / Diploma in Textile Technology / Textile Chemistry / Textile Processing from a recognized Institute or Any Science Graduate from a recognized college / University or B.Sc. in Home Science passed with Physics & Chemistry subject at 10+2 / Intermediate level.

Admission Process: Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at Institute.

Reservation: 27%, 15% & 7.5% seats will be reserved for OBC, SC & ST Candidates respectively.

Stipend: Rs. 2500/- per month.

Note: - Advertisement inviting application is released every year in the month of May in all leading newspapers by the Department of Handlooms & Textiles of respective State Government for Diploma Course and by this Institute for Post Diploma Course.

(C) **Bachelor of Technology (Handloom and Textile Technology) – 4 years Duration (8 Semesters)**

1) B.Tech. (Handloom and Textile Technology) - First (1st) Year

- Duration – 8 Semesters (4 Years)
- Intake – 60+6 (EWS)

Eligibility for Admission -

Counselling for Admission conducted by	No. of seats	States covered
Central Seat Allocation Board (CSAB) https://csab.nic.in https://josaa.nic.in	30+3 (EWS)	Open for all states/UT of India
Dr. APJ Abdul Kalam Technical University (AKTU), Lucknow https://uptac. admissions.nic.ind	30+3 (EWS)	a) 80% seats for UP candidates
e		b) 20% seats open for all states/UT of India

Student should have appeared in JEE main and should have JEE main score card. Based on the JEE main score, student may participate in following counselling to get admission in B.Tech (HTT) first year.

After all rounds of the above counselling, **vacant seats** will be filled directly by the **Institute through counselling**. Advertisement inviting applications against vacant seats of B.Tech (HTT) will be published in newspapers. Candidates having JEE main score may apply for the vacant seats and participate in this counselling. Student must watch our website http://www.iihtvaranasi.edu.in for regular update.

(2) B.Tech. (Handloom and Textile Technology) - 2nd year admission through lateral entry -

Eligibility for admission-

    Students must have appeared CUET 2023 exam and should have CUET score card. Based on the CUET score card, students may participate in following counselling to get admission in B.Tech. direct 2nd year.

1. 10% of sanctioned intake are filled by **UPTAC counselling** conducted by AKTU based on the marks obtained in CUET Exam.
2. Unfilled seats of first year are filled by the Institute through lateral entry in 2nd year by **Institute counselling** based on CUET score. Advertisements are published in newspapers. Student must watch our website http://www.iihtvaranasi.edu.in for regular update.

Admission Process:

1. Admission to B.Tech. First year in 1st semester –

a) 33 seats are offered to candidates attending JEE main counseling conducted by Central Seat Allocation Board (CSAB).
b) Another 33 seats are offered to candidates attending UPTAC counseling of AKTU Uttar Pradesh.
c) If some seats remain vacant at the end of the counseling of CSAB and UPTAC, the same will be filled by the Institute from the applications received through the Institute website on the merit of JEE score.

2. Admission to B.Tech. Second year in 3rd semester (for diploma holder/B.Sc. candidates only) –

a) Six seats are offered under lateral entry (Direct Second Year) admission for B.Tech.(Handloom & Textile Technology) through UPTAC counseling for the students of Uttar Pradesh.
b) The unfilled seats of first year will be offered to the diploma/graduates having CUET score card from all over India under lateral entry (direct second year) admission. Applications for lateral entry against unfilled seats of first year shall be submitted through Institute's website before the prescribed due date.

Reservation: 27%, 15% & 7.5% seats will be reserved for OBC, SC & ST Candidates respectively and in addition to this 10% of total seats reserved for EWS candidates.

Stipend paid by the Government to each student-

B.Tech.: Rs. 3000/- per month.

- **Calendar for Admission against Management/Vacant Seats:**
  There is no Provision for Management/Vacant Seats

12. Criteria and Weightages for Admission

For DHTT Programme–

Educational Qualification: To be eligible for admission to first year of Diploma Course in Handloom & Textile Technology, the candidate should have passed X Standard or equivalent examination with English as a subject of study.

Admission Process: Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at the Institute.

Age Limit: The age of candidate should be between 15 – 23 years and for SC/ST candidate, age should be between 15 and 25 years as on 1st July every year.

For PDTP Programme–

Educational Qualification: A candidate having three years Diploma in Handloom Technology / Diploma in Handloom & Textile Technology / Diploma in Textile Technology / Textile Chemistry / Textile Processing from a recognized Institute.

Or

Any Science Graduate from a recognized college / University

Or

B.Sc. in Home Science passed with Physics & Chemistry subject at 10+2 / Intermediate level.

Admission Process: Admission will be made strictly on merit basis by considering the marks obtained in qualifying examination followed by the counseling at the Institute.

For B Tech (HTT) Programme–

The AKTU eligibility criteria for B.Tech., 1st year is that a candidate must have passed intermediate examination of Uttar Pradesh Board or 10+2 level examination or any equivalent exam from a recognized board/ university without grace in required compulsory subjects and one optional subject and securing minimum of 45% marks (40% marks for SC/ST Category candidates) in aggregate.

1st Year of B.Tech. shall be based on the score/percentile/rank in JEE Main and UPCET both. However, the first preference will be given to JEE Main candidates.

Course	Compulsory Subjects	Any of the Following Subjects	Qualifying Marks
B.Tech.(Handloom and Textile Technology)	Physics & Mathematics	Chemistry/ Biotechnology/ Biology	45% Marks for General Category 40% Marks for SC/ST Category

13. List of Applicants –

UNDER PROCESS

14. Results of Admission under Management Seats/Vacant Seats

There is no provision for the admission under the Management seats.

15. Information of Infrastructure and Other Resources Available

Number of Class Rooms and size of each –

Class Room	Size (Area in sqm)	Building
Diploma 01D	80	Old Building
Diploma 02D	80	Old Building
Diploma 03D	80	Old Building
Diploma 04D	80	Old Building
Diploma 05D	59.25	ITOC
Diploma 06D	57.71	ITOC
Post Diploma 01PD	56.26	ITOC
Under Graduate 01UG	79.35	ITOC
Under Graduate 02UG	66.65	ITOC
Under Graduate 03UG	67.60	ITOC
Under Graduate 04UG	65.76	ITOC

Number of Tutorial Rooms and size of each –

Tutorial Room	Size(Area in sqm)	Building
Diploma	52.09	ITOC
Post Diploma	39.07	ITOC
Under Graduate	52.09	ITOC

Number of Laboratories –

Programme	Lab Name	Size (Area in sqm)	Building
Under Graduate	Catd Lab	78.87	ITOC
Diploma	Chemistry Lab	137	ITOC
Diploma	Computer Lab	159.54	ITOC
Under Graduate	Electrical/Electronics Lab	86	ITOC
Under Graduate	Fashion Designing Lab	-	ITOC
Under Graduate	Garment Technology Lab	-	ITOC
Under Graduate	Physics Lab	86	ITOC
Diploma	Textile Printing Lab	-	ITOC
Diploma	Textile Processing Lab	-	Old
Diploma	Textile Testing Lab	-	ITOC
Diploma	Weaving-I	-	ITOC
Diploma	Weaving-Ii	217	Old
Diploma	Weaving-Iii	581	Old
Under Graduate	Yarn Manufacturing Lab	-	-
DIPLOMA	Additional Workshop	200	ITOC
UNDER GRADUATE	Additional Workshop	200	ITOC
DIPLOMA	CCM	84.43	ITOC
POST DIPLOMA	DYEING	350	Old
UNDER GRADUATE	FABRIC ANALYSIS LAB	62	ITOC
UNDER GRADUATE	FIBER SCIENCE	73.35	ITOC
UNDER GRADUATE	GARMENT CONSTRUCTION LAB	126.58	ITOC
UNDER GRADUATE	HANDLOOM WVG LAB	148	ITOC
POST DIPLOMA	PTG.	150	ITOC
UNDER GRADUATE	TEX. TESTING UG	102.26	ITOC
UNDER GRADUATE	TEXTILE DESIGN AND COLOUR	60	ITOC
UNDER GRADUATE	Workshop	229.57	Old
DIPLOMA	Workshop	229.57	Old
UNDER GRADUATE	Language Laboratory	80.29	ITOC
UNDER GRADUATE	Engineering Mechanics Lab		ITOC

Number of Drawing Halls with size of each-

Drawing Hall	Size (Area in sqm)	Building
Under Graduate 01DH	132	ITOC
Diploma 01DH D	132	ITOC

Number of Computer Centers with Capacity of each-

Computer Centre	Capacity
01 CLAB	20

Online Examination Facility –

Computer Centre	Number of Nodes	Internet Bandwidth
01	20	38Mbps

Barrier Free Built Environment for Disabled And Elderly Persons-

Yes

Occupancy Certificate:

भारत सरकार

केन्द्रीय लोक निर्माण विभाग

वाराणसी केन्द्रीय उपमण्डल, केन्दान्चल, बड़ालालपुर, लमही,

वाराणसी—221007

Email ID:- aevcsd@rediffmail.com

Ph. No. 0542-2290626 Mo. No. 9450704703

ई-मेल द्वारा भी

CPWD

पत्रांक: सहा.अभि. / वाके उपम / आई.टी.ओ.सी. / 2020 / 22 दिनांक: 16/01/2020

सेवा में,

निदेशक

भारतीय हथकरघा प्रौद्योगिकी संस्थान

चौकाघाट, वाराणसी—221002

विषय: परिसर में निर्मित आई.टी.ओ.सी. भवन के हस्तांतरण के संबंध में।

संदर्भ: आपके पत्र सं. IHTV/Adm-26(A)/Vol.-V/18 dt. 10.01.2020

महोदय,

आपके परिसर में नव निर्मित आई.टी.ओ.सी. भवन ,समस्त गोदरेज के फर्नीचर के साथ 10.01.2020 को हस्तांतरित कर दिया गया है।

यह आपके सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित है।

सहायक अभियंता

वाराणसी केन्द्रीय उपमंडल

के0लो0नि0वि0,वाराणसी

प्रतिलिपि:— श्रीमान कार्यपालक अभियंता, इलाहाबाद,के.लो.नि.वि.,इलाहाबाद को सूचनार्थ प्रेषित।

सहायक अभियन्ता

P-25/6

भारत सरकार
केन्द्रीय लोक निर्माण विभाग
सहायक अभियन्ता , वाराणसी केन्द्रीय उपमंडल
केन्द्रांचल , बडा लालपुर, लमही , वाराणसी–221007
Email ID:- aevcsd@rediffmail.com
Ph./Fax No. 0542-2290626 Mo. No. 09450704703

पत्रांकः सहा.अभि. / वाकेउपमं / ITOC/2019 / 110   दिनांकः 13/03/19

Sr ML
ITOC फाइल
13/03/19
Inventory check (Take over)हेतु.

सेवा में,
कार्यालय प्रमुख्य
Indian Institute of Handloom Technology
Chowkaghat, Varanasi-221002

विषयः **Regarding Inventory of I.T.O.C Building in IIHT Campus.**

महोदय,

निवेदन है,कि उपरोक्त भवन जिसके सभी सिविल कार्य पूरे हो चुके है,का उद्घाटन माननीय प्रधानमंत्री जी के द्वारा दिनांक 22.01.2019 को किया गया था।

इस पत्र के साथ भवन के सिविल मदों की Inventory संलग्न है। आपसे अनुरोध है,कि कृपया सात दिन में उपरोक्त को जांच कर भवन अपने अधिकार में लेने का कष्ट करें। यदि Inventory की जांच में कोई कठिनाई हो तो मैं विभाग से अपने कनिष्ठ अभियंता को भी भेज दूंगा।

संलग्नक – भवन में लगे सिविल मदों की इनवेंटरी की लिस्ट।

13/3/19
सहायक अभियंता
वाराणसी केन्द्रीय उपमंडल
के0लो0नि0वि0,वाराणसी

प्रतिलिपिः–   कार्यपालक अभियंता इलाहाबाद केन्द्रीय मंडल,केलोनिवि इलाहाबाद को सादर सूचनार्थ प्रेषित।

सहायक अभियन्ता

Fire and Safety Certificate:

प्रारूप-झ (संलग्नक-9)
अग्नि एवं जीवन सुरक्षाप्रमाण पत्र का नवीनीकरण

यूआईडी संख्या: **UPFS/2022/43081/VRN/VARANASI/948/CFO**

दिनांक: **17-01-2022**

प्रमाणित किया जाता है कि मैसर्स **INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY** (भवन/प्रतिष्ठान का नाम) पता **CHAUKAGHAT,IIHT CAMPUS, CHAUKAGHAT,SADAR** तहसील - **SADAR** जिसमे

ब्लॉक/टावर	तलों की संख्या	बेसमेन्ट की संख्या	ऊँचाई
1	4	0	14.10 mt.

तथा प्लाट एरिया **32828.96 sq.mt** है। भवन का अधिभोग **INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY** (भवन स्वामी/ अधिभोगी अथवा कम्पनी का नाम) द्वारा किया जा रहा है। इनके द्वारा भवन में अग्नि निवारण एवं अग्नि सुरक्षा व्यवस्थायें एन0बी0सी0 एवं तलसंबंधी भारतीय मानक ब्यूरो के आई0एस0 के अनुसार भवन में स्थापित व्यवस्थाओं का अनुरक्षण किया जा रहा है। जिसका निरीक्षण अग्निशमन अधिकारी द्वारा दिनांक **09-02-2022** को भवन स्वामी के प्रतिनिधि श्री **P THENNARASU MO- 9445671467** के साथ किया गया तथा भवन में अधिष्ठापित अग्नि एवं जीवन सुरक्षा व्यवस्थाओं को मानको के अनुसार यथास्थिति में पाया गया। अतः प्रश्नगत भवन को अग्नि एवा जीवन सुरक्षाप्रमाण पत्र का नवीनीकरण (Renewal of Fire & Life Safety Certificate)(एन0बी0सी0 की अधिभोग श्रेणी) **Educational** के अन्तर्गत वैधता तिथि **10-02-2022** से **09-02-2025** तक 3 वर्षों के लिये इस शर्त के साथ दिया जा रहा है कि भवन में सभी मानको का अनुपालन किया जायेगा तथा भवन के इस प्रमाण पत्र का नवीनीकरण निर्धारित समयावधि के अन्तर्गत पुनः कराया जायेगा तथा नवीनीकरण से पूर्व भवन में स्थापित अग्निशमन व्यवस्थाओं को क्रियाशील रखने की जिम्मेदारी आपकी होगी।

Note : 1. स्थापित अग्निशमन उपकरणों को सदैव कार्यशील दशा में रखना होगा।
2. निकास मार्ग सदैव अवरोधमुक्त रखना अनिवार्य है।
3. प्रत्येक 03 माह पर मॉक ड्रिल कराया जाना अनिवार्य है।
4. शासनादेश संख्याः 18/छः-पु0-8-2022/905(34)/2016टी0सी0 गृह(पुलिस) अनुभाग-8 लखनऊः दिनांक 07 जनवरी, 2022 मे0 अंकित प्राविधानो के अन्तर्गत निर्गत।

"यह प्रमाण-पत्र आपके द्वारा प्रस्तुत अभिलेखों, सूचनाओं के आधार पर निर्गत किया जा रहा है। इनके असत्य पाये जाने पर निर्गत प्रमाण-पत्र मान्य नहीं होगा। यह प्रमाण-पत्र प्रति / भवन के स्वामित्व / अधिभोग को प्रमाणित नहीं करता है।"

इस्ताक्षर (निर्गमन अधिकारी)

(मुख्य अग्निशमन अधिकारी)

☑

Digitally Signed By
(ANIMESH SINGH)

[A78FC82668406773 1A385857 559 8072261 C8973A]

10-02-2022

निर्गत किये जाने का दिनांक : **10-02-2022**
स्थान : **VARANASI**

Hostel Facilities –

Hostel	Size(Area in sqm)
Boy's Hostel HOS-1	1052
Boy's Hostel HOS-2	1250
Girl's Hostel HOS-3	602

Other facilities in Hostel-

Reading Room, Electrification, Watercooler etc.

Library:

- Number of Library Books – **5658**
- Number of Titles – **2866**
- Journals Available -**22**
- List of online National/International Journals subscribed – **02**
- E-Library Facilities –**Yes**
- National Digital Library (NDL) subscription details – Yes,**19th Feb 2020**
- Registered Email Id on NDL – *iihtvns@gmail.com*

Laboratory and Workshop:

List of Major Equipment/Apparatus/Experimental Set-up in Basic Electrical Lab

S. No.	Name of the Apparatus /Equipment
1.	Network Theorem Trainer Kit
2.	Digital Function Generator
3.	Cathode Ray Oscilloscope (CRO)
4.	AC Inductive Load (R-L Load) Measurement Experimental Setup
5.	R-L-C Resonance (Series/Parallel) Study Kit
6.	Fluorescent Lamp Power and Power Factor measurement Apparatus
7.	Experimental Setup for Power Measurement in 3 Phase by Two Wattmeter method
8.	Set-up for Voltage ratio, Polarity Ratio and Efficiency of Single-Phase transformer 1kVA
9.	Experimental Set-up for DC Shunt motor (Load Test)
10.	Study of Running and Reversal of Three Phase Induction Motor

List of Major Equipment/Apparatus/Experimental Set-up in Fundamental of Electrical and Electronics Engineering Lab

S. No.	Name of the Apparatus /Equipment
1.	Cathode Ray Oscilloscope (CRO)
2.	AC Load (R-L Load) Measurement Experimental Setup
3.	R-L-C Resonance (Series/Parallel) Study Kit
4.	Transistor Characteristics Study Apparatus
5.	Operational Amplifiers (Op-amp) Study Kit
6.	Set-up for Efficiency of Single-Phase transformer 1kVA
7.	Logic Gates Trainer Kit

List of Major Equipment/Apparatus/Experimental Set-up in Electronics Engineering Lab

S. No.	Name of the Apparatus /Equipment
1.	Resistor Assorted Kit
2.	Dual Channel Dc Regulated Power Supply
3.	Cathode Ray Oscilloscope (CRO)
4.	Digital Function Generator
5.	PN Junction Diode Characteristics Study Kit
6.	Zener Diode Characteristics Study Kit
7.	Transistor Characteristics Study Kit
8.	HWR And FWR Rectifiers Circuit Study Kit
9.	Op-Amp Study Kit for Adder And Subtractor
10.	Truth Table Verification of Various Logic Gates Study Kit
11.	SOP And POS Implementation Trainer Study Kit
12.	Digital IC Trainer Kit

List of Major Equipment/Apparatus/Experimental Set-up in Engineering Chemistry Lab/Chemical Processing Lab

S.No	Name of the chemical/glassware/apparatus
1.	25 ml /10 ml specific gravity bottle with lid
2.	Weighing bottle
3.	Boiling tube
4.	Ostwald viscometer
5.	stalagmometer
6.	glass electrode
7.	Conductivity meter(Digital)With conductivity cell
8.	Hot air oven
9.	Water bath(copper)
10.	pH-meter
11.	Digital calorimeter

12.	Bomb calorimeter
13.	Digital Laboratory Balance
14.	Desiccator
15.	Daniel cell apparatus
16.	Specific gravity bottle
17.	HTHP Dying Machine
18.	Winch Dying Machine
19.	Padding Mangle
20.	Winch Semi Automatic Machine
21.	Stenter Machine
22.	Solar Dying Machine
23.	Jet Dying Machine
24.	Curing Oven Machine

List of Major Equipment/Apparatus/Experimental Set-up in Engineering Physics Lab

S.No.	Equipment Name/Apparatus
1.	Sodium Lamp
2.	Traveling Microscope
3.	Convex Lens (Different focal length)
4.	Optical Bench
5.	Fresnel's Bi-prism
6.	Bar pendulum
7.	Energy band gap kit
8.	Stephan's constant study kit
9.	Carey Foster's Bridge study kit
10.	LCR Resonance trainer kit
11.	Calibration of Voltmeter & Ammeter using Potentiometer study kit
12.	B-H Curve set up
13.	Cathode Ray Oscilloscope (CRO)
14.	Vernier calipers & Screw gauge
15.	Inclined plane apparatus
16.	Fly wheel apparatus
17.	Viscosity by Stokes apparatus with stand
18.	Diode laser with wooden bench set up
19.	Resistance in series & parallel Study kit

List of Major Equipment/Apparatus/Experimental Set-up in Language Lab

S.No.	Equipment Name/Apparatus
1.	21 No. of Computer Systems
2.	07 Headphones
3.	Software Used – I tell language lab software.

List of Major Equipment/Apparatus/Experimental Set-up in Computer Lab

S.No.	Equipment Name/Apparatus
1.	20 No. of Computer Systems
2.	**Internet Bandwidth – 38Mbps**
3.	Quick Heal Antivirus

List of Major Equipment/Apparatus/Experimental Set-up in Workshop Lab

S.No.	Equipment Name/Apparatus
1.	Lathe Machine
2.	Drilling Machine
3.	Wooden Lathe Machine
4.	Electric Arc Welding Machine
5.	Angle Grinder
6.	Grinding Machine
7.	Riveting Machine

List of Major Equipment/Apparatus/Experimental Set-up in Engineering Mechanics Lab

S.No.	Equipment Name/Apparatus
1.	Polygon Force Apparatus
2.	Differential Axel&Wheel Apparatus
3.	Single Purchase winch-crab Apparatus Machine
4.	Double Purchase winch-crab Apparatus Machine
5.	Warm & Warm Wheel Apparatus
6.	Jib and Crane Apparatus
7.	Simply Supported Beam Apparatus with Weighing Machine
8.	Inclined Plane Apparatus

List of Major Equipment/Apparatus/Experimental Set-up in Engineering Graphics Lab

S.No.	Equipment Name/Apparatus
1.	No. of Drawing Boards – 28 unit

List of Major Equipment/Apparatus/Experimental Set-up in Textile Testing Lab

S.No.	Equipment Name/Apparatus
1.	Conditioning Oven
2.	Wet and Dry Bulb Hygrometer
3.	Knowledge Balance
4.	Beesleys Balance
5.	Electronic Balance
6.	Lea Strength Tester
7.	Uster Evenness Tester
8.	Single Yarn Strength Tester
9.	Fabric Stifness Tester
10.	IcI Pilling Tester
11.	Ordinary Microscope
12.	Crock Meter

13.	Pesperisation Tester
14.	Xeno tester
15.	Geometric Gray Scale
16.	GSM Round Cutter (Hydraulic)
17.	Pick Counting Glass
18.	Thickness Gauge Digital
19.	Drape Meter
20.	Crimp Tester
21.	Electronic Twist Tester
22.	Automatic Wrap Block
23.	Digital Microscope (With Software)
24.	Filling Tester
25.	Tensile Strength Tester (With Compression Attachment)
26.	Water Vapour Permeability Tester
27.	Perspiro Meters
28.	Quadrant Balance
29.	Elmendorf Tearing Strength Tester
30.	Crease Recovery Tester
31.	Automatic Air Permeability Tester
32.	Fibrograph

List of Major Equipment/Apparatus/Experimental Set-up in Handloom Weaving Lab and Jacquard Lab

S.No.	Equipment Name/Apparatus
1.	Automatic Power Loom
2.	Plain Power Loom
3.	Power Loom with positive Let off Motion
4.	Fly Shuttle Handloom
5.	Semi Automatic Paddle Loom
6.	Banaras Semi Automatic Loom
7.	Madanpura Semi-Automatic Loom
8.	Iron Simple Loom
9.	Motorized Jacquard Lifting Machine
10.	Horizontal Warping Machine
11.	Jacquard With Loom
12.	Frame Loom

13.	Electronics Card Cutting Machine
14.	Winding Machine
15.	Card Lacing Stand
16.	CATD Software (Araha View)
17.	Jala Loom Extra Wept
18.	Card Punching Machine / Semi Automatic Punching Machine
19.	Sessional Warping Machine
20.	High Speed Winding Machine
21.	Hand Punching Machine
22.	Automatic Pirn Winding Machine
23.	Cone/Cheese Winder Machine

List of Major Equipment/Apparatus/Experimental Set-up in Yarn Manufacturing Lab

S.No.	Equipment Name/Apparatus
1.	Carding Machine
2.	Ring Frame Machine
3.	Draw Frame Machine
4.	Rotor Spinning Machine
5.	Speed Frame Machine

COMPUTING FACILITIES

• **Internet Bandwidth**	38 Mbps
• **Number and Configuration of system**	73
• **Total No. of system connected by LAN**	20
• **Total No. of system connected by WAN**	1(Airtel)

• **Major Software Packages Available**

S.No.	Software Name	Objective	Remarks
1	Dev C++	For Programming	Open Source
2	Turbo C++	For Programming	Open Source
3	Netbeans	For Programming	Open Source
4	Corel Draw	Used For Designing	Open Source
5	Weka Tool	Machine Learning	Open Source
6	Java	For Programming	Open Source
7	Python Anaconda	Machine Learning Programming	Open Source
8	Visual Studio	Tool Used for writing code	Open Source
9	MS Office 7	For Office Document Work	Open Source
10	Notepad ++	Used For HTML Coding, PHP coding and text editor	Open Source
11	Adobe flash Player	Used to stream and view video,audio and multimedia	Open Source
12	Fast Download Manager	Downloader	Open Source
13	WinRAR	Used data compression	Open Source
14	Adobe Acrobat Reader DC	To view PDF files	Open Source
15	Continental	CATD	Purchased
16	Arahne Weave	CATD	Purchased
17	Digibunai	CATD	Purchased
18	Google Crome	For internet Surfing	Open Source
19	Quick Heal Antivirus	Antivirus	Purchased
20	Google Indic Input Tool	Hindi Typing	Open Source
21	VLC Media Player	Video Player	Open Source
22	Any Video Converter Software	Video Converter	Open Source
23	Paintshop	Designing software	Open Source
24	Google Meet	Online Classses	Open Source

• Special Purpose Facilities Available (Conduct of online Meetingd/Webinars/Workshop,etc.)		• Google Meet • Zoom • Webx
• Facilities for Conduct of classes/courses in online mode(Theory and practical)		• Teachmint • Google Meet

• Innovation Cell

INNOVATION CELL

1	Dr. P. Thennarasu	Director	Chairman
2	Jitender Tak	Teaching	startup activity coordinator
3	Ashok Kumar Singh	Teaching	Convener, Internship activity Coordinator
4	Dillip Kumar Das	Teaching	IPR Activity Coordinator
5	Dr. Vinay Kumar Chauhan	Teaching	NIRF Coordinator
6	Dr. N. Srikrishna	Teaching	Innovation Activity
7	Sunil Kumar Pandey	Teaching	ARIIA Coordinator
8	Abhinav Mishra	Teaching	Member
9	Saurabh Gupta	Teaching	Member
10	Anita Devi	Teaching	Member
11	Steeve Roy	Teaching	Member
12	Amit Shukla	Teaching	Social Media
13	Sagar Maurya	3rd Sem B.Tech	Innovation Coordinator
14	Khushi Tripathi	3rd Sem B.Tech	Startup Coordinator
15	Mohammad Hazique	3rd Sem B.Tech	Internship Coordinator
16	Shivam Bhardwaj	3rd Sem B.Tech	Social Media Coordinator
17	Anushka Mishra	3rd Sem B.Tech	ITR Coordinator
18	Shilpa Mishra	3rd Sem B.Tech	Member
19	Aditya Kumar Mishra	1st Sem B.Tech	Member

- **Social Media Cell**

1.	Dr. P. Thennarasu	Director	Chairman
2.	Shri Ashok Kumar Singh	Sr. Lecturer (Tex.)	Vice-Chairman
3.	Shri Dillip Kumar Das	Sr. Lecturer (Tex.)	Member
4.	Shri Amit Shukla	Demonstrator(w)	Member
5.	Tanmay Majee	3rd Sem - B.Tech	General Secretary
6.	Akanksha Kumari	3rd Sem - B.Tech	Cultural Secretary
7.	Devansh Mishra	6th Sem - DHTT	General Secretary
8.	Vaishnavi Verma	6th Sem - DHTT	Cultural Secretary

• Compliance of the National Academic Depository (NAD), applicable to PGCM/PGDM Institution and University Departments	On Process

2. List of Facilities Available

- **Games and Sports.**

S.No	Sport Equipments	Quantity
1	Cricket Bat	07
2	Cricket Stumps	13
3	Cricket Kit	02
4	Volley Ball Net	03
5	Volley Ball	04
6	Table Tennis Bat	08 set
7	Table Tennis Table	03
8	Chess	08
9	Carom Board	08
10	Badminton Racket	18 set
11	Football	02
12	Scoreboard	01

13	Air Pump	02
14	Weight Machine	01
15	Disk Through	02
16	Shot-put	02
17	Javelin Through	02
18	Bull Worker	02
19	Dumbbells	06 set
20	Lifting rod	03
21	Lifting Weight Plate	10
22	Batons	60
23	Hundrle	24
24	Marking Cone	60
25	Stop Watch	02

- **Games Played**

Indoor	Outdoor
Carom Board	Volley Ball
Chess	Football
Badminton	Cricket
Table Tennis	Shot-put
Gym	Javelin Through
Kho-Kho	Disk Through
Tug Walk	High Jump
Sack Race	Long Jump
---------------	Running

- **Play Ground**

S.No	Ground Name	No. of Grounds
1	Badminton Ground	03
2	Volley Ball Ground	02
3	Common Ground	01

- Extra Curricular Activities

SNo.	Curricular Activities
1.	Annual Function
2.	Vastra Test Series
3.	Quiz Competition
4.	Drawing Competition

- **Soft Skill Development Facilities**

SNo.	Name of Lab	No. of computer	Objective
1.	Language Lab	21	For Listening, and Skill Development

3. Teaching Learning Process

- Curriculum and Syllabus for each of the programmes as approved by the University

Diploma

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
Bargarh/Fulia/Guwahati/Jodhpur/Salem/Varanasi/Champa/Kannur/KHTI-Gadag/SPKM-Venkatagiri
DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY

REGULATION 2021 – CURRICULUM

SEMESTER - I								
Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Basic Science	BS101	Mathematics - I	2	1	0	3	3
2	Basic Science	BS105	Applied Chemistry	2	1	0	3	3
3	Humanities & Social Science	HS101	Communication Skills in English	2	0	0	2	2
4	Engineering Science	ES101	Engineering Graphics	0	0	3	3	1.5
5	Engineering Science	ES103	Engineering Workshop Practice	0	0	3	3	1.5
6	Basic Science	BS109	Applied Chemistry Lab	0	0	2	2	1
7	Humanities & Social Science	HS103	Sports and Yoga	0	0	2	2	1
8	Humanities & Social Science	HS105	Communication Skills in English Lab	0	0	2	2	1
9	Audit	AU102	Environmental Science	2	0	0	2	0
						Total Credits		14

SEMESTER - II								
Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Basic Science	BS102	Mathematics - II	3	1	0	4	4
2	Basic Science	BS103	Applied Physics	2	1	0	3	3
3	Engineering Science	ES102	Introduction to IT System	3	0	0	3	3
4	Engineering Science	ES104	Fundamentals of Electrical, Electronics Engineering	2	1	0	3	3
5	Engineering Science	ES106	Engineering Mechanics	2	1	0	3	3
6	Basic Science	BS107	Applied Physics Lab	0	0	2	2	1
7	Engineering Science	ES108	Introduction to IT System Lab	0	0	2	2	1
8	Engineering Science	ES110	Fundamentals of Electrical, Electronics Engineering Lab	0	0	2	2	1
9	Engineering Science	ES112	Engineering Mechanics Lab	0	0	2	2	1
						Total Credits		20

SEMESTER - III

Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Programme Core	HTPC201	Textile Fibers	3	0	0	3	3
2	Programme Core	HTPC202	Yarn Manufacturing Technology	3	0	0	3	3
3	Programme Core	HTPC203	Handloom Weaving Technology	3	0	0	3	3
4	Programme Core	HTPC204	Fabric Structure – I	2	1	0	3	3
5	Programme Core	HTPC205	Chemical Processing of Textiles - I	3	0	0	3	3
6	Programme Core	HTPC206	Handloom Weaving Technology Lab	0	0	4	4	2
7	Programme Core	HTPC207	Fabric Analysis & Costing Lab - I	0	0	2	2	1
8	Programme Core	HTPC208	Chemical Processing of Textiles Lab - I	0	0	4	4	2
9	Internship	SI201*	Internship – I	0	0	0	0	2
						Total Credits		**22**

SEMESTER - IV

Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Programme Elective	HTPE2**	Programme Elective - I	3	0	0	3	3
2	Programme Core	HTPC209	Weaving Technology - I	3	0	0	3	3
3	Programme Core	HTPC210	Fabric Structure – II	2	1	0	3	3
4	Programme Core	HTPC211	Chemical Processing of Textiles –II	3	0	0	3	3
5	Programme Core	HTPC212	Textile Testing - I	3	0	0	3	3
6	Programme Core	HTPC213	Colour Concept and Textile Design Lab	0	0	2	2	1
7	Programme Core	HTPC214	Weaving Technology Lab	0	0	4	4	2
8	Programme Core	HTPC215	Chemical Processing of Textiles Lab - II	0	0	4	4	2
9	Programme Core	HTPC216	Textile Testing Lab – I	0	0	3	3	1.5
10	Audit	AU202	Essence of Indian Knowledge and Tradition	2	0	0	2	0
						Total Credits		**21.5**

SEMESTER - V

Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Programme Elective	HTPE3**	Programme Elective - II	3	0	0	3	3
2	Programme Elective	HTPE3**	Programme Elective - III	3	0	0	3	3
3	Programme Core	HTPC301	Weaving Technology - II	3	0	0	3	3
4	Programme Core	HTPC302	Textile Testing - II	3	0	0	3	3
5	Open Elective	##	Open Elective - I	3	0	0	3	3
6	Programme Core	HTPC304	Jacquard Weaving & Computer Aided Textile Designing Lab	0	0	4	4	2
7	Programme Core	HTPC305	Textile Testing Lab - II	0	0	3	3	1.5
8	Projects	PR202	Minor Projects	0	0	4	4	2
9	Internship	SI301**	Internship – II	0	0	0	0	3
10	Audit	AU302	Indian Constitution	2	0	0	2	0
11	Humanities & Social Science	HS302	Seminar	0	0	3	3	1.5
						Total Credits		**25**

SEMESTER - VI

Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
1	Humanities & Social Science	HS303	Entrepreneurship and Start-ups	3	1	0	4	4
2	Programme Elective	HTPE3**	Programme Elective - IV	3	0	0	3	3
3	Open Elective	##	Open Elective - II	3	0	0	3	3
4	Projects	PR302	Major Project	0	0	8	8	4
5	Programme Core	HTPC306	Fabric Analysis & Costing Lab - II	0	0	2	2	1
6	Programme Core	HTPC307	Handicraft Textiles & Handloom Tourism of India	3	0	0	3	3
						Total Credits		**18**

DETAILS OF CREDIT DISTRIBUTION

Category	Credits Allotted	Credit required as per AICTE Norms
Humanities and Social Sciences	9.5	8
Basic Sciences	15	19
Engineering Science	15	15
Programme Core	52	45-50
Programme Elective	12	12-16
Open Elective	6	9-12
Summer Internship - I	2	2
Summer Internship - Il	3	3
Minor Project	2	2
Major Project	4	4
Audit Course	0	0
Overall Credit	120.5	119

LIST OF PROGRAMME ELECTIVES (PE)

Programme Elective-I		Programme Elective-II		Programme Elective -III		Programme Elective-IV	
Code no.	Course Title	Code no.	Course Title	Code no.	Course Title	Code no.	Course Title
HTPE201	Textile Costing	HTPE301	Knitting Technology	HTPE304	Technical Textiles	HTPE307	Technological Developments in Handlooms
HTPE202	Garment Manufacturing Technology	HTPE302	Advanced Fabric Structure	HTPE305	Apparel Marketing and Merchandising	HTPE308	Traditional Handloom Textiles of India
HTPE203	Non-Woven Technology	HTPE303	Fashion Designing	HTPE306	Advances in Textile Processing	HTPE309	Home Textiles

LIST OF OPEN ELECTIVES (OE)

Open Elective-I		Open Elective-II	
Code no.	Course Title	Code no.	Course Title
HTOE301	Product Design	HTOE305	Project Management
HTOE302	Introduction to E - Governance	HTOE306	Operations Research
HTOE303	Cyber Security laws, Standards and IPR	HTOE307	Internet of Things
HTOE304	Engineering Economics and Accountancy	HTOE308	Virtual Reality
HTOE309	Energy Conservations and Audit	HTOE311	Disaster Management
HTOE310	Renewable Energy Technologies	HTOE312	Marketing Management and Foreign Trade

*Internship — I (3-4 weeks)   **2 Credits**

The internship with course code SI201 pertains to the 3rd semester. This shall be undertaken during the summer vacation at the end of 2nd semester. After completing the internship, the students shall submit the report to the faculty during the 3rd semester for assessment. This internship shall be undertaken in an industry/Govt. or Pvt. Certified Agencies which are in Social sector/ Govt. Skill Centers/Institutes/Schemes.

Internship — II (4-6 weeks)   **3 Credits

The internship with course code SI301 pertains to the 5th semester. This shall be undertaken during the summer vacation at the end of 4th semester. After completing the internship, the students shall submit the report to the faculty during the 5th semester for assessment. This shall be undertaken in an industry only.

Major Project   **4 Credits**

PR302 Should be based on real/ live problems of the Industry/Govt./NGO/MSME/Rural sector or an innovative idea having the potential of a Start-up.

Syllabus for DHTT

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY

REGULATION 2021

SEMESTER I

BS101 : MATHEMATICS I

L	T	P	C
2	1	0	3

COURSE OBJECTIVES

This course is designed to give a comprehensive coverage at an introductory level to the subject of Trigonometry, Differential Calculus, permutations, combinations and Basics of Probability and statistics.

Unit 1   TRIGONOMETRY   9

Concept of angles, measurement of angles in degrees, grades and radians and their conversions, T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2).

Unit 2   DIFFERENTIAL CALCULUS   9

Definition of function; Concept of limits. Four standard limits $\lim_{x \to a} \left(\frac{x^n - a^n}{x-a} \right)$, $\lim_{x \to 0} \left(\frac{\sin x}{x} \right)$, $\lim_{x \to a} \left(\frac{a^x - 1}{x} \right)$, and $\lim_{x \to a} \left(1 + x \right)^{\frac{1}{x}}$, Differentiation by definition of x^n, $\sin x$, $\cos x$, $\tan x$, e^x and $\log_a x$. Differentiation of sum, product quotient of functions. Differentiation of trigonometric and inverse trigonometric functions, Logarithmic differentiation, Exponential functions.

Unit 3   PERMUTATIONS & COMBINATIONS   9

Value of ^nP_r and ^nC_r. Binomial theorem: Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems.

Unit 4   PROBABILITY & RANDOM VARIABLE   9

Axioms of Probability - Conditional Probability - Total Probability – Baye's theorem - Definition of Random variable – and Types.

Unit 5   STATISTICAL QUALITY CONTROL   9

Concept of samples – types of samples - Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

COURSE OUTCOMES

At the end of the study of this course, the students will be able to

CO1   Appreciate the importance of the geometric study as well as the calculation and the mathematical analysis, by applying trigonometric concepts.

CO2   Find the effects of changing conditions on a system

CO3   Solve simple counting problems using permutations and combination concept

CO4   Apply the concept of probability and random variable in solving real life problems.

CO5   Analyse the quality of samples by applying sampling technique

TEXT BOOK

1   B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.

2   G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9thEdition,1995.

3   ReenaGarg,EngineeringMathematics,KhannaPublishingHouse,NewDelhi(Revised Ed.2018)

REFERENCE BOOK

1   Sundaram, R. Balasubramanian, K. A. Lakshminarayanan, Engineering Mathematics, 6/e., Vi-kas Publishing House.

2   Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

3   Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

4   Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014

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BS105: APPLIED CHEMISTRY

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

To understand, ascertain and analyze and properties of natural raw materials require for producing economical and eco-friendly finished products.

1   Solve various engineering problems applying the basic knowledge of atomic structure and chemical bonding.

2   Use relevant water treatment method to solve domestic and industrial problems.

3   Solve the engineering problems using knowledge of engineering materials and properties.

4   Use relevant fuel and lubricants for domestic and industrial applications

5   Solve the engineering problems using concept of Electrochemistry and corrosion.

Unit 1   ATOMIC STRUCTURE, CHEMICAL BONDING   9
         &SOLUTIONS

Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted),

and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principle, Quantum numbers–orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configuration. Concept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H2, F2, HF hybridization in BeCl2, BF3, CH4, NH3, H2O), coordination bond in NH_4^+, and anomalous properties of NH_3, H_2O due to hydrogen bonding, and metallic bonding. Solution – idea of solute, solvent and solution, methods to express the concentration of solution molarity (M=mole per liter), ppm, mass percentage, volume percentage and mole fraction.

Unit 2   WATER   9

Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.

Cause of poor lathering of soap in hard water, problems caused by the use of hard water in boiler (scale and sludge, foaming and priming, corrosion etc), and quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation.

   i). Water softening techniques – soda lime process, zeolite process and ion exchange process.

   ii). Municipal water treatment (in brief only) – sedimentation, coagulation, filtration, sterilization.

   Water for human consumption for drinking and cooking purposes from any water sources and enlist Indian standard specification of drinking water (collect data and understand standards).

Unit 3   ENGINEERING MATERIALS   9

Natural occurrence of metals – minerals, ores of iron, aluminium and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy. Extraction of - iron from haematite ore using blast furnace, aluminium from bauxite along with reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications. General chemical composition, composition based applications (elementary idea only details omitted): Port land cement and hardening, Glasses Refractory and Composite materials. Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (using PVC, PS, PTFE, nylon – 6, nylon-6,6 and Bakelite), rubber and vulcanization of rubber.

Unit 4   CHEMISTRY OF FUELS ANDLUBRICANTS   9

Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV), calculation of HCV and LCV using Dulong's formula. Proximate analysis of coal

solid fuel Petrol and diesel - fuel rating (octane and cetane numbers), Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and bio gas.

Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism – hydrodynamic and boundary lubrication, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid numbers a pontification value) of lubricants.

Unit 5   ELECTROCHEMISTRY   9

Electronic concept of oxidation, reduction and redox reactions.
Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.
Industrial Application of Electrolysis

- Electrometallurgy
- Electroplating
- Electrolyticre fining.

Application of redox reactions in electrochemical cells –
- Primary cells – dry cell,
- Secondary cell- commercially used lead storage battery, fuel and Solar cells.
  Introduction to Corrosion of metals–
- Definition, types of corrosion (chemical and electrochemical), H_2 liberation and O_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.
  Internal corrosion preventive measures –
- Purification, alloying and heat treatment and External corrosion preventive measures: a) metal (anodic, cathodic) coatings, b) organic inhibitors.

                                                                          Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
   CO1   Describe the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemical bonding.
   CO2   Assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.
   CO3   Qualitatively analyze the engineering materials and appreciate their properties and applications.
   CO4   Choose fuel and lubricants suitable for economical industrial processing to obtain eco-friendly finished products.
   CO5   a) Ascertain construction, mechanism efficiency of electrochemical cells, solar cell fuel cells
          b) Explain corrosion and develop economical prevention techniques.

TEXT BOOK

1. Text Book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
2. Agarwal, & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi,2015.
3. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd.,2011.
4. Dara,S.S & Dr.S.S.Umare, Engineering Chemistry,S. Chand. Publication, New Delhi, 2015.
5. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; NewDelhi,2015.

REFERENCE BOOK

1. Dr. Vairam, S.,Engineering Chemistry,Wiley India Pvt. Ltd.,New Delhi,2013.
2. Dr. G. H. Hugar & Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol.II, NITTTR, Chandigarh, Publications,2013,14.
3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd.,2014.
4. www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding)
5. www.visionlearning.com (Atomic structure and chemical bonding)
6. www.chem1.com (Atomic structure and chemical bonding)
7. https://www.wastewaterelearning.com/elearning/ (Water Treatment)
8. www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials)
9. www.em-ea.org/guide%20books/book /2.1%20fuels%20and%20combustion.pdf (Fuel and Combustion)
10. www.chemcollective.org (Metals,Alloys)
11. www.wqa.org(Water Treatment)

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HS101: COMMUNICATION SKILLS IN ENGLISH

	L	T	P	C
	2	0	0	2

COURSE OBJECTIVES

Communication skills play an important role in career development. This course aims at introducing basic concepts of communication skills with an emphasis on developing personality of the students. Thus, the main objectives of this course are:

1. To develop confidence in speaking English with correct pronunciation.
2. To develop communication skills of the students i.e. listening, speaking, reading and writing skills.
3. To introduce the need for personality development- Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc.

Unit 1   COMMUNICATION: THEORY AND PRACTICE   5

- Basics of communication: Introduction, meaning and definition, process of communication etc.
- Types of communication: formal and informal, verbal, non-verbal and written

Barriers to effective communication.

- **7** Cs for effective communication (considerate, concrete, concise, clear, complete, correct, courteous).

- Art of Effective communication,
    - ➢ Choosing words
    - ➢ Voice
    - ➢ Modulation
    - ➢ Clarity
    - ➢ Time
    - ➢ Simplification of words
    - ➢ Technical Communication.

Unit 2   SOFT SKILLS FOR PROFESSIONAL EXCELLENCE   5

- Introduction: Soft Skills and Hard Skills.

- Importance of soft skills.

- Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.

- Applying soft skills across cultures.

- Case Studies.

Unit 3   READING COMPREHENSION   6
Comprehension, vocabulary enhancement and grammar exercises based on reading of the following texts:
Section-1
   Malgudi Days: R.K. Narayan
   The Room on Roof: Ruskin Bond "The Gift of the Magi" by O. Henry
   "Uncle Podger Hangs a Picture" Jerome K. Jerome
Section-2
   Night of the Scorpion by Nissim Ezekiel,
   Stopping by Woods on a Snowy Evening by Robert
   Frost, Where the Mind is Without Fear by
   Rabindranath Tagore, Ode to Tomatoes by Pablo
   Neruda,

Unit 4   PROFESSIONAL WRITING   7
   The art of précis writing, Letters: business and personnel,
   Drafting e-mail, notices, minutes of a meeting etc.
   Filling- up different forms such as banks and on-line forms for placement etc.

Unit 5   VOCABULARY AND GRAMMAR   7

Total: 30 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Develop basic speaking and writing skills including proper usage of language and vocabulary so that they can become highly confident and skilled speakers and writers.

CO2   Communicate effectively in presentations, interviews and other forms of oral communication

CO3   Draft emails and letters professionally

CO4   Develop non-verbal communication such as proper use of body language and gestures.

TEXT BOOK

1   J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.

2   Lindley Murray, An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.

3   Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Re- vised Edition 2018)

REFERENCE BOOK

1   Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.

2   M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.

3   John Nielson. Effective Communication Skills. Xlibris, 2008.

4   Oxford Dictionary

5   Roget's Thesaurus of English Words and Phrases

6   Collin's English Dictionary

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ES101: ENGINEERING GRAPHICS

	L	T	P	C
COURSE OBJECTIVES	0	0	3	1.5

1   To understand the language of graphics which is used to express ideas, convey instructions while carrying out engineering jobs.

2   To develop drafting and sketching skills, to know the applications of drawing equipment, and get familiarize with Indian Standards related to engineering drawings.

3   To develop skills to visualize actual object or a part of it, on the basis of drawings.

4   To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.

5   Tounderstandthebasiccommandsanddevelopbasicskillsrelatedtocomputeraideddrafting, of how to draw, modify, and edit basic shapes (2D), using AUTOCAD.

S. No.	Practical Exercises	Unit No.	Approx. Hrs
1	Draw horizontal, Vertical, 30 degree, 45 degree, 60 and 75 degrees lines, different types of lines, dimensioning styles using Tee and Set squares/ drafter. (do this exercise in sketch book)	I	02
2	Write alphabets and numerical (Vertical only) (do this exercise in sketch book)	I	02
3	Draw regular geometric constructions and redraw the given figure (do this exercise in sketch book) Part I	II	02
4	Draw regular geometric construction and redraw the given figure (do this exercise in sketch book) Part II	II	02
5	Draw a problem on orthographic projections using first angle method of projection having plain surfaces and slanting. Part I	III	02
6	Draw another problem on orthographic projections using first angle method of projection having slanting surfaces with slots. Part II	III	02
7	Draw two problems on orthographic projections using first angle method of projection having cylindrical surfaces. Part I	III	02
8	Draw two problems on Isometric view of simple objects having plain and slanting surface by using natural scale. Part I	IV	02
9	Draw some problems on Isometric projection of simple objects having cylindrical surface by using isometric scale. Part I	IV	02
10	Draw free hand sketches/ conventional representation of machine elements in sketch book such as, nuts, bolts, washers. Part I	V	02
11	Problem based Learning: Given the orthographic views of at least three objects with few missing lines, the student will try to imagine the corresponding objects, complete the views and draw these views in sketch book. Part I	III, II, V	02
12	Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment). Part I	V	02
13	Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment). Part II	V	02
14	Draw basic 2D entities like: Circular and rectangular array using AutoCAD (Printout should be a part of progressive assessment). Part III	V	02
15	Draw blocks of 2D entities comprises of Rectangle, Rhombus, Polygon, Circles, Arcs, circular and rectangular array, blocks using AutoCAD (Print out should be a part of progressive assessment). Part IV	V	02

16	Draw basic branch specific components in 2D using AutoCAD (Printout should be a part of term work). Part I	VI	02
17	Draw complex branch specific components in 2D using AutoCAD (Print should be a part of progressive assessment). Part I	VI	02
	Total		34

Unit 1   BASIC ELEMENTS OF DRAWING   8

Drawing Instruments and supporting materials: method to use them with applications. Convention of lines and their applications.

Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.

Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.

Geometrical and Tangency constructions. (Redraw the figure)

Unit 2   ORTHOGRAPHIC PROJECTIONS   8

Introduction of projections-orthographic, perspective, isometric and oblique: concept and applications. (No question to be asked in examination).

Introduction to orthographic projection, First angle and Third angle method, their symbols.

Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, cylindrical surfaces. (use First Angle Projection method only)

Unit 3   ISOMETRIC PROJECTIONS   8

Introduction to isometric projections. Isometric scale and Natural scale.

Isometric view and isometric projection.

Illustrative problems related to objects containing lines, circles and arcs shape only. Conversion of orthographic views into isometric view/projection.

Unit 4   FREE HAND SKETCHES OF ENGINEERING   6
          ELEMENTS

Free hand sketches of machine elements: nuts, bolts, washer, (For branches other than mechanical Engineering, the teacher should select branch specific elements for free hand sketching) Free hand sketches of orthographic view (on squared graph paper)

Unit 5   COMPUTER AIDED DRAFTING INTERFACE   7
Computer Aided Drafting: concept.

Hardware and various CAD software available.

System requirements and Understanding the interface.

Components of AutoCAD software window: Title bar, standard tool bar, menu bar, object properties tool bar, draw tool bar, modify tool bar, cursor cross hair. Command window, status bar, drawing area, UCS icon.

File features: New file, Saving the file, Opening an existing drawing file, Creating templates, Quit.

Setting up new drawing: Units, Limits, Grid, Snap. Undoing and redoing action.

Unit 6   COMPUTER AIDED DRAFTING   8
Draw basic entities like Line, Circle, Arc, Polygon, Ellipse, Rectangle, Multiline, Poly Line.

Method of Specifying points: Absolute coordinates, Relative Cartesian and Polar coordinates.

Modify and edit commands like trim, extend, delete, copy, offset, array, block, layers.

Dimensioning: Linear, Horizontal Vertical, Aligned, Rotated, Baseline, Continuous, Diameter, Radius, Angular Dimensions.

Dim scale variable. Editing dimensions.
Text: Single line Text, Multiline text.

Standard sizes of sheet. Selecting Various plotting parameters such as Paper size, paper units, Drawing orientation, plot scale, plot offset, plot area, print preview.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1   Select and construct appropriate drawing scales, use drawing Equipment's with Indian Standards of engineering drawing.
CO2   Draw views of given object and components.
CO3   Sketch orthographic projections into isometric projections and vice versa.
CO4   Apply computer aided drafting tools to create 2D engineering drawings.

TEXT BOOK
1   Bureau of Indian Standards. Engineering Drawing Practice for Schools and Colleges IS: Sp-46. BIS. Government of India
2   Bhatt, N. D. Engineering Drawing. Charotar Publishing House, Anand, Gujrat 2010; ISBN: 978-93- 80358-17-8

3	Jain & Gautam, Engineering Graphics & Design, Khanna Publishing House, New Delhi (ISBN: 978- 93-86173-478)
4	Jolhe, D. A. Engineering Drawing. Tata McGraw Hill Edu. New Delhi, 2010; ISBN: 978-0-07- 064837-
5	Dhawan, R. K. Engineering Drawing. S. Chand and Company, New Delhi; ISBN: 81-219-1431-0
6	Shah, P. J. Engineering Drawing. S. Chand and Company, New Delhi, 2008, ISBN:81-219-2964-4.
7	Kulkarni, D. M.; Rastogi, A. P.; Sarkar, A. K. Engineering Graphics with AutoCAD. PHI Learning Pri- vate Limited-New Delhi (2010); ISBN: 978-8120337831.
	Jeyapoovan, T. Essentials of Engineering Drawing and Graphics using AutoCAD. Vikas Publishing HousePvt. Ltd, Noida, 2011; ISBN: 978-8125953005.
8	Autodesk. AutoCAD User Guide. Autodesk Press, USA, 2015.
9	Sham, Tickoo. AutoCAD 2016 for Engineers and Designers. Dreamtech Press; Galgotia Publication, New Delhi, 2015; ISBN 978-9351199113.

REFERENCE BOOK

1	https://www.youtube.com/watch?v=TJ4jGyD-WCw
2	https://www.youtube.com/watch?v=dmt6_n7Sgcg
3	https://www.youtube.com/watch?v=_MQScnLXL0M
4	https://www.youtube.com/watch?v=3WXPanCq9LI
5	https://www.youtube.com/watch?v=fvjk7PlxAuo
6	http://www.me.umn.edu/coursesme2011/handouts/engg%20graphics.pdf
7	https://www.machinedesignonline.com

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ES103 ENGINEERING WORKSHOP PRACTICE

	L	T	P	C
	0	0	3	1.5

COURSE OBJECTIVES

1. To understand basic engineering processes for manufacturing and assembly.
2. To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's.
3. To understand and interpret job drawings, produce jobs, and inspect the job for specified dimensions.
4. To understand the various types of wiring systems and acquire skills in house wiring.
5. To understand, operate, control different machines and equipment's adopting safety practices.

Unit 1   CARPENTRY   8

   i)   Demonstration of different wood working tools/machines.

   ii)   Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc.

  iii)   One simple job involving any one joint like mortise and tenon dovetail, bridle, half lap etc.

Unit 2   FITTING   9

   i)   Demonstration of different fitting tools and drilling machines and power tools

   ii)   Demonstration of different operations like chipping, filing, drilling, tapping, sawing, cutting etc.

  iii)   One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.

Unit 3   WELDING   8

   i)   Demonstration of different welding tools / machines.

   ii)   Demonstration on Arc Welding, Gas Welding, of broken parts with welding.

  iii)   One simple job involving butt and lap joint.

Unit 4   SHEET METAL WORKING   8

   i)   Demonstration of different sheet metal tools / machines.

   ii)   Demonstration of different sheet metal operations like sheet cutting, bending, edging, end curling, lancing, and riveting.

  iii)   One simple job involving sheet metal operations and riveting.

Unit 5   ELECTRICAL HOUSE WIRING   8

    Practice on simple lamp circuits

   i)   one lamp controlled by one switch by surface conduit wiring,

   ii)   Lamp circuits- connection of lamp and socket by separate switches,

  iii)   Connection of Fluorescent lamp/tube light,

  iv)   Simple lamp circuits-in- stall bedroom lighting. And

   v)   Simple lamp circuits- install stair case wiring.

Unit 6   DEMONSTRATION   4

   i)   Demonstration of measurement of Current, Voltage, Power and Energy.

   ii)   Demonstration of advance power tools, pneumatic tools, electrical wiring tools and accessories.

  iii)   Tools for Cutting and drilling.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines.

CO2   Draw and complete jobs as per specifications in allotted time.

CO3   Inspect the job for the desired dimensions and shape.

CO4   Operate, control different machines and equipment's adopting safety practices.

REFERENCE BOOK

1   S.K. Hajara Chaudhary, Workshop Technology, Media Promoters and Publishers, New Delhi, 2015.

2   B.S. Raghuwanshi, Workshop Technology, Dhanpat Rai and sons, New Delhi2014.

3   K. Venkat Reddy, Workshop Practice Manual, BS Publications, Hyderabad2014.

4   Kents Mechanical Engineering Hand book, John Wiley and Sons, NewYork.

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BS107: APPLIED CHEMISTRY LAB

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians. The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

LIST OF PRACTICALS:

Perform any 12 (twelve) Laboratory Practicals

VOLUMETRIC AND GRAVIMETRIC ANALYSIS

1. Preparation of standard solution of oxalic acid or potassium permanganate.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.
3. Standardization of $KMnO_4$ solution using standard oxalic acid and Determine the percentage of iron present in given Hematite ore by $KMnO_4$ solution.
4. Iodometric estimation of copper in the copper pyriteore.
5. Volumetric estimation of total acid number (TAN) of given oil.
6. Volumetric estimation of
   a) Total hardness of given water sample using standard EDTA solution.
   b) Alkalinity of given water sample using 0.01M sulphuric acid
7. Proximate analysis of coal
   a) Gravimetric estimation moisture in given coal sample
   b) Gravimetric estimation ash in given coal sample

INSTRUMENTAL ANALYSIS

1. Determine the conductivity of given water sample.
2. Determination of the Iron content in given cement sample using colorimeter.
3. Determination of calorific value of solid or liquid fuel using bomb calorimeter.
4. Determination of viscosity of lubricating oil using Red wood viscometer.
5. Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
6. To verify the first law of electrolysis of copper sulfate using copper electrode.
7. Construction and measurement of EMF of electro chemical cell (Daniel cell).
8. To study the effect of dissimilar metal combination.

Total   45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Differentiate different methods of quantitative analysis.
CO2   Perform quantitative analysis using instruments.
CO3   Use various apparatus for precise measurements.
CO4   Construct different electrochemical cells used in developing batteries.
CO5   Appreciate methods of corrosion abetments.

TEXT BOOK

1   Text book of Chemistry for Class XI & XII (Part-I, Part-II); N.C.E.R.T., Delhi,2017-18.
2   Dr. G. H. Hugarand ProfA.N.Pathak, Applied Chemistry Laboratory Practices, Vol.I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
3   Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd.,2014.

REFERENCE BOOK

1   Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi,2015.

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HS103: SPORTS AND YOGA

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

1   To make the students understand the importance of sound health and fitness principles as they relate to better health.
2   To expose the students to a variety of physical and yogic activities aimed at stimulating their continued inquiry about Yoga, physical education, health and fitness.
3   To create a safe, progressive, methodical and efficient activity based plan to enhance improvement and minimize risk of injury.
4   To develop among students an appreciation of physical activity as a lifetime pursuit and a means to better health.

Unit 1   INTRODUCTION TO PHYSICAL EDUCATION
- Meaning & definition of Physical Education
- Aims & Objectives of Physical Education
- Changing trends in Physical Education

Unit 2   OLYMPIC MOVEMENT
- Ancient & Modern Olympics (Summer & Winter)
- Olympic Symbols, Ideals, Objectives & Values
- Awards and Honours in the field of Sports in India (Dronacharya Award, Arjuna Award, Dhayan chand Award, Major Dhyan chand Khel Ratna Award etc.)

Unit 3   PHYSICAL FITNESS, WELLNESS & LIFESTYLE
- Meaning & Importance of Physical Fitness & Wellness
- Components of Physical fitness o Components of Health related fitness
- Components of wellness o Preventing Health Threats through Lifestyle Change
- Concept of Positive Lifestyle

Unit 4   FUNDAMENTALS OF ANATOMY & PHYSIOLOGY
IN PHYSICAL EDUCATION, SPORTS AND YOGA
- Define Anatomy, Physiology & Its Importance
- Effect of exercise on the functioning of Various Body Systems. (Circulatory System, Respiratory System, Neuro-Muscular System etc.)

Unit 5   KINESIOLOGY, BIOMECHANICS & SPORTS
- Meaning & Importance of Kinesiology & Biomechanics in Physical Edu. & Sports
- Newton's Law of Motion & its application in sports.
- Friction and its effects in Sports.

Unit 6   POSTURES
- Meaning and Concept of Postures.
- Causes of Bad Posture.
- Advantages & disadvantages of weight training.
- Concept & advantages of Correct Posture.
- Common Postural Deformities – Knock Knee; Flat Foot; Round Shoulders; Lordosis, Kyphosis, Bow Legs and Scoliosis.
- Corrective Measures for Postural Deformities

Unit 7   YOGA
- Meaning & Importance of Yoga
- Elements of Yoga
- Introduction - Asanas, Pranayama, Meditation & Yogic Kriyas
- Yoga for concentration & related Asanas (Sukhasana; Tadasana; Padmasana &

Shashankasana)
- Relaxation Techniques for improving concentration - Yog-nidra

Unit 8   YOGA & LIFESTYLE
- Asanas as preventive measures.
- Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana.
- Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana.
- Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana.
- Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana.
- Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana.

Unit 9   TRAINING AND PLANNING IN SPORTS
- Meaning of Training
- Warming up and limbering down
- Skill, Technique & Style
- Meaning and Objectives of Planning.
- Tournament – Knock-Out, League/Round Robin & Combination

Unit 10   PSYCHOLOGY & SPORTS
- Definition & Importance of Psychology in Physical Edu. & Sports
- Define & Differentiate Between Growth & Development
- Adolescent Problems & Their Management
- Emotion: Concept, Type & Controlling of emotions
- Meaning, Concept & Types of Aggressions in Sports.
- Psychological benefits of exercise.
- Anxiety & Fear and its effects on Sports Performance.
- Motivation, its type & techniques.
- Understanding Stress & Coping Strategies.

Unit 11   DOPING
- Meaning and Concept of Doping
- Prohibited Substances & Methods
- Side Effects of Prohibited Substances

Unit 12   SPORTS MEDICINE
- First Aid – Definition, Aims & Objectives.
- Sports injuries: Classification, Causes & Prevention.

- Management of Injuries: Soft Tissue Injuries and Bone & Joint Injuries

Unit 13 SPORTS / GAMES

Following sub topics related to any one Game/Sport of choice of student out of: Athletics, Badminton, Basketball, Chess, Cricket, Kabaddi, Lawn Tennis, Swimming, Table Tennis, Volleyball, Yoga etc.
- History of the Game/Sport.
- Latest General Rules of the Game/Sport.
- Specifications of Play Fields and Related Sports Equipment.
- Important Tournaments and Venues.
- Sports Personalities.
- Proper Sports Gear and its Importance.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Practice Physical activities and Hatha Yoga focusing on yoga for strength, flexibility, and relaxation.

CO2   Learn techniques for increasing concentration and decreasing anxiety which leads to stronger academic performance.

CO3   Learn breathing exercises and healthy fitness activities

CO4   Understand basic skills associated with yoga and physical activities including strength and flexibility, balance and coordination.

CO5   Perform yoga movements in various combination and forms.

CO6   Assess current personal fitness levels.

CO7   Identify opportunities for participation in yoga and sports activities.

CO8   Develop understanding of health-related fitness components: cardiorespiratory endurance, flexibility and body composition etc.

CO9   Improve personal fitness through participation in sports and yogic activities.

CO10 Develop understanding of psychological problems associated with the age and lifestyle. First Year Curriculum Structure Common to All Branches 34

CO11 Demonstrate an understanding of sound nutritional practices as related to health and physical performance.

CO12 Assess yoga activities in terms of fitness value.

CO13 Identify and apply injury prevention principles related to yoga and physical fitness activities.

CO14 Understand and correctly apply biomechanical and physiological principles elated to exercise and training.

REFERENCE BOOK

1   Modern Trends and Physical Education by Prof. Ajmern Singh.
2   Light On Yoga By B.K.S. Iyengar.
3   Health and Physical Education – NCERT (11[th] and 12[th] Classes)

HS105: COMMUNICATION SKILLS IN ENGLISH LAB

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

Communication skills play an important role in career development. This lab course aims at actively involving students in various activities to improve their communication skills with an emphasis on developing personality of the students. Thus, the objectives of this course are:

1. To develop listening skills for enhancing communication.
2. To develop speaking skills with a focus on correct pronunciation and fluency.
3. To introduce the need for Personality development-Focus will be on developing certain qualities which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

Unit 1   LISTENING SKILLS   7

Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

Unit 2   INTRODUCTION TO PHONETICS   8

Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division, word stress, intonation, voice etc.

Unit 3   SPEAKING SKILLS   8

Standard and formal speech: Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

Unit 4   BUILDING VOCABULARY   7

Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

Total: 30 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Communicate effectively with an increase in their confidence to read, write and speak English fluently.

CO2   Demonstrate a significant increase in word power.

CO3   The variety of exercises and activities that will be conducted in the Language Lab will develop their skills needed to participate in a conversation like listening carefully and respectfully to others' view points; articulating their own ideas and questions clearly and overall students will be able to prepare, organize, and deliver an engaging oral presentation.

CO4 Develop non-verbal communication such as proper use of body language and gestures.

CO5 Communicate effectively with an increase in their confidence to read, write and speak English fluently.

TEXTBOOK

1 Daniel Jones. *The Pronunciation of English.* Cambridge: Cambridge University Press 1956.

2 James Hartman & etal. Ed. *English Pronouncing Dictionary.* Cambridge: Cambridge University Press, 2006.

3 Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed.2018)

REFERENCE BOOK

1 J.D.O'Connor. *Better English Pronunciation.* Cambridge: Cambridge University Press, 1980.

2 Lindley Murray. *An English Grammar: Comprehending Principles and Rules.* London: Wilson and Sons, 1908.

3 Margaret M. Maison. *Examine your English.* Orient Longman: New Delhi: 1964.

4 J.Sethi & et al. *A Practice Course in English Pronunciation.* New Delhi: Prentice Hall, 2004.

5 Pfeiffer, William Sanborn and T.V.S Padmaja. *Technical Communication: A Practical Approach.* 6th ed. Delhi: Pearson,2007.

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AU102: ENVIRONMENTAL SCIENCE

		L	T	P	C
COURSE OBJECTIVES		2	0	0	0

Technicians working in industries or elsewhere essentially require the knowledge of environmental science so as to enable them to work and produce most efficient, economical and eco-friendly finished products.

1 Solve various engineering problems applying ecosystem to produce eco – friendly products.

2 Use relevant air and noise control method to solve domestic and industrial problems.

3 Use relevant water and soil control method to solve domestic and industrial problems.

4 To recognize relevant energy sources required for domestic and industrial applications.

5 Solve local solid and e-waste problems.

Unit 1   ECO SYSTEM   9

Structure of ecosystem, Biotic & Abiotic components Food chain and food web. Aquatic (Lentic and Lotic) and terrestrial ecosystem. Carbon, Nitrogen, Sulphur, Phosphorus cycle. Global warming -Causes, effects, process, Green House Effect, Ozone depletion

Unit 2   AIR AND, NOISE POLLUTION   9

Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.C., Boiler)

Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator)

Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000

Unit 3   WATER AND SOIL POLLUTION   9

Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis).

Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

Unit 4   RENEWABLE SOURCES OF ENERGY   9

Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer, Solar stills.

Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilization and storage of biogas.

Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy.

New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin and power plants of geothermal energy

Unit 5   SOLID WASTE MANAGEMENT, ISO 14000 &   9
              ENVIRONMENTAL MANAGEMENT

Solid waste generation- Sources and characteristics of Municipal solid waste, E- waste, biomedical waste.

Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste

Air quality act 2004, air pollution control act 1981 and water pollution and control act1996.

Structure and role of Central and state pollution control board.

Concept of Carbon Credit, Carbon Footprint.

Environmental management in fabrication industry.

ISO14000: Implementation in industries, Benefits.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Understand the ecosystem and terminology and solve various engineering problems applying ecosystem knowledge to produce eco – friendly products.

CO2 Understand the suitable air, extent of noise pollution, and control measures and acts.

CO3 Understand the water and soil pollution, and control measures and acts.

CO4 Understand different renewable energy resources and efficient process of harvesting.

CO5 Understand solid Waste Management, ISO 14000 & Environmental Management.

CO6 Different methods of teaching and media to be used to attain classroom attention.

CO7 Massive open online courses (MOOCs) may be used to teach various topics/sub topics.

CO8 15-20% of the topics which are relatively simpler of descriptive in nature should be given to the students for self-learning and assess the development of competency through classroom presentations.

CO9 Micro-projects may be given to group of students for hand-on experiences

C10 Encouraging students to visit to sites such as Railway station and research establishment around the institution.

TEXT BOOK

1 S.C. Sharma & M.P. Poonia, Environmental Studies, Khanna Publishing House, NewDelhi

2 C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011. First Year Curriculum Structure Common to All Branches 52

3 Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099

4 Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000, ISBN 10: 0471144940.

5 O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi

6 Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication, 2007, ISBN: 81-224-1835-X.

7 Rao, M. N.Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07- 451871-8.

8 Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978, ISBN: 9780070354760.

9 Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford, UK; 2013. ISBN: 9780123978257.

10 Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6

11 Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.

| 12 | Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018) |
| 13 | Open source software and website address: |

1) www.eco-prayer.org
2) www.teriin.org
3) www.cpcp.nic.in
4) www.cpcp.gov.in
5) www.indiaenvironmentportal.org.in
6) www.whatis.techtarget.com
7) www.sustainabledevelopment.un.org
8) www.conserve-energy-future.com

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SEMESTER II

BS102: MATHEMATICS - II

	L	T	P	C
COURSE OBJECTIVES	3	1	0	4

This course is designed to give a comprehensive coverage at an introductory level to the subject of matrices, Integral Calculus coordinate geometry, Basic elements of vector algebra and Testing of Hypothesis.

Unit 1   DETERMINANTS AND MATRICES   12

Elementary properties of determinants up to 3rd order, consistency of equations, Crammer's rule. Algebra of matrices, Inverse of a matrix, matrix in verse method to solve a system of linear equations in 3variables.

Unit 2   INTEGRAL CALCULUS   12

Integration as inverse operation of differentiation. Simple integration by substitution, by arts   and by partial fractions (for linear factors only). Use of formulas $\int_0^{\frac{\pi}{2}} sin^n x \, dx$, $\int_0^{\frac{\pi}{2}} cos^n x \, dx$ and $\int_0^{\frac{\pi}{2}} sin^m x \, cos^n x \, dx$ for solving problems Where m and n are positive integers.

Unit 3   CO-ORDINATE GEOMETRY   12

Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula. General equation of a circle and its characteristics. To find the equation of a circle, given:

    i. Centre and radius,

    ii.   Three points lying on it and

iii. Coordinates of end points of a diameter;

Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems on conics when their foci, directories or vertices are given.

Unit 4   VECTOR ALGEBRA   12

Definition notation and rectangular resolution of a vector. Addition and subtraction of vectors. Scalar and vector products of 2 vectors. Simple problems related to work, moment and angular velocity.

Unit 5   TESTING   OF HYPOTHESIS   12

Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample tests based on Normal distribution for single mean -Tests based on t for single mean, Chisquare and F distributions   - Goodness of fit.

Total: 60 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Appreciate the importance of the Determinants are the factors that scale different parameterizations so that they all produce same overall integrals, i.e. they are capable of encoding the inherent geometry of the original shape.

CO2   Apply Integration for cumulative effect.

CO3   Relate the connection between algebra and geometry through graphs of lines and curves.

CO4   Apply the concept of testing of hypothesis for small and large samples in real life problems.

TEXTBOOK

1   B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.

2   G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.

3   S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.

REFERENCE BOOK

1   Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.

2   ReenaGarg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi

3   Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.

4   Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014

BS103: APPLIED PHYSICS

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

The course will help the diploma engineers to apply the basic concepts and principles to solve broad-based engineering problems and to understand different technology based applications.

Unit 1   PHYSICAL QUANTITIES AND MEASUREMENTS   9

Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units), Dimensions and dimensional formulae of physical quantities, Principle of homogeneity of dimensions, Dimensional equations and their applications, Limitations of dimensional analysis.

Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect), Errors in measurements (systematic and random), absolute error, relative error, error estimation and significant figures.

Unit 2   PROPERTIES OF MATTER   9

Elasticity: definition of stress and strain, moduli of elasticity (definition only), Hooke's law, stress-strain curve and its significance.

Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems.

Moment of inertia and its physical significance, Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).

Friction: concept, types, laws of limiting friction, coefficient of friction, and its engineering applications

Unit 3   HEAT   9

Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), scales of temperature and their relationship, Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them, Coefficient of thermal conductivity, engineering applications.

Unit 4   WAVE MOTION AND OPTICS   9

Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, amplitude, phase, phase difference, Free, damped and forced vibrations with examples, resonance.

Basic optical laws: reflection and refraction, refractive index, image formation by lenses, lens formula, magnification, Simple microscope and its uses, Total internal reflection, Critical angle and conditions for total internal reflection, Lasers: Energy levels, spontaneous and stimulated emission; population inversion, laser characteristics, applications of lasers.

Unit 5   ELECTRICITY AND ELECTRONICS   9

Electric Current and its units, Resistance and its units, Conductance, Series and parallel combination of resistances. Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications, Capacitance and its units, Series and parallel combination of capacitors.

Insulator, semi-conductor, conductor, intrinsic and extrinsic semiconductors, p-n junction, junction diode, forward and reverse biased junction diodes, Transistor; description and three terminals, Working of PnP and NpN transistor.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to

CO1   Identify physical quantities, select their units for use in engineering solutions, and make measurements with accuracy by minimizing different types of errors.

CO2   A) Explain Hooke's law and its significance.

B) Describe the viscosity of liquids, coefficient of viscosity and the various factors affecting its value and determine viscosity of an unknown fluid using Stokes' Law and the terminal velocity.

C) Describe forms of friction and methods to minimize friction between different surfaces.

CO3   A) Illustrate the terms; heat and temperature, measure temperature in various processes on different scales (Celsius, Fahrenheit, and Kelvin etc.).

B) Distinguish between conduction, convection and radiation; identify different methods for reducing heat losses and mode of heat transfer between bodies at different temperatures

CO4   Establish wave parameters: frequency, amplitude, wavelength, and velocity.

CO5   A) Illustrate the conditions for light amplification in various LASER and laser based instruments and optical devices.

B) Differentiate between insulators, conductors and semiconductors

TEXT BOOK

1   Text Book of Physics for Class XI & XII (Part-I, Part-II); N.C.E.R.T.,Delhi
2   Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill,Delhi.
3   Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. NewDelhi
4   A TEXT BOOK of Optics, N.Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.

REFERENCE BOOK

1   Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, NewDelhi
2   Engineering Physics by DK Bhhatacharya &Poonam Tandan; Oxford University Press,New Delhi.
3   Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.

ES102: INTRODUCTION TO IT SYSTEM

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

This course is intended to make new students comfortable with computing environment - Learning basic computer skills, learning basic application software tools, Understanding Computer Hardware, Cyber security awareness

Unit 1   9

Basic Internet skills: Understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. General understanding of various computer hardware components — CPU, Memory, Display, Keyboard, Mouse, HDD and other Peripheral Devices.

Unit 2   9

OS Installation (Linux and MS Windows), Unix Shell and Commands,*

Unit 3   9

Basics of HTML & CSS, Making Basic Personal Web-Page.

Unit 4   9

Office Tools: OpenOffice Writer, OpenOffice Spreadsheet (Calc), OpenOffice Impress. (MS-office)

Unit 5   9

Introduction of C language: History, Basic data type, Basic conditional statement, Simple program.

                                          Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

- Comfortably work on computer, install and configure OS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/ attacks.

ES104: FUNDAMENTALS OF ELECTRICAL, ELECTRONICS ENGINEERING

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

To provide basic knowledge of the different elements and concepts of electrical engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.

Unit 1   OVERVIEW OF DIGITAL ELECTRONICS,   9
          ELECTRONIC COMPONENTS & SIGNALS
Passive & Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources. Boolean Algebra & Operations, Gates-Functional Block Approach, Storage elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).

Unit 2   OVERVIEW OF ANALOG CIRCUITS   9
Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.

Unit 3   ELECTRIC AND MAGNETIC CIRCUITS   9
EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.

Unit 4   A.C. CIRCUITS   9
Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, Power in A. C. Circuits, power triangle.

Unit 5   TRANSFORMER AND MACHINES   9
General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

                                                          Total: 45 Hour

REFERENCE BOOK
1   Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House
2   Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
3   Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
4   Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN: 9788121924405
5   Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi,

2015, ISBN: 9788121924375

6   Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513

7   Sedha, R.S., A TEXT BOOK of Applied Electronics, S.Chand, New Delhi, 2008, ISBN-13: 978- 8121927833

8   Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Education, New Delhi,2015, ISBN-13:

9   Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504

10 Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

ES106: ENGINEERING MECHANICS

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

Following are the objectives of this course:

1   To obtain resultant of various forces.
2   To calculate support reactions through conditions of equilibrium for various structures.
3   To understand role of friction in equilibrium problems.
4   To know fundamental laws of machines and their applications to various engineering problems.

Unit 1   BASICS OF MECHANICS AND FORCE SYSTEM   9

Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification. Resolution of a force— Orthogonal components of a force, moment of a force, Varignon's Theorem. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, co-planar force systems – Law of triangle, parallelogram and polygon of forces.

Unit 2   EQUILIBRIUM   9

Equilibrium and, Free body and Free body diagram, Analytical and graphical methods of analyzing equilibrium. Lami's Theorem – statement and explanation, Application for various engineering problems. Types of beam, supports (simple, roller and fixed) and loads acting on beam (vertical point load, uniformly distributed load). Beam reaction for cantilever, simply supported beam without overhang – subjected to combination of Point load and uniformly distributed load.

Unit 3   FRICTION   9

Friction and its relevance in engineering, types and laws of friction, limiting equilibrium,

limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

Unit 4   CENTROID AND CENTRE OF GRAVITY   9
Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle). Centroid of composite figures composed of not more than three geometrical figures. Centre of Gravity of simple solids (Cube, cuboid, cone, and cylinder).

Unit 5   SIMPLE LIFTING MACHINE   9
Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility. Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Simple screw jack.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
  CO1   Identify the force systems for given conditions by applying the basics of mechanics.
  CO2   Determine unknown force(s) of different engineering systems.
  CO3   Apply the principles of friction in various conditions for useful purposes.
  CO4   Find the centroid and centre of gravity of various components in engineering systems.
  CO5   Select the relevant simple lifting machine(s) for given purposes.

TEXTBOOK
  1   D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi(2008)
  2   Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
  3   Bansal R K, A TEXT BOOK of Engineering Mechanics, Laxmi Publications
  4   Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.

REFERENCE BOOK
  1   Dhade, Jamadar &Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
  2   Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cam- bridge University Press.
  3   Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

BS107: APPLIED PHYSICS LAB

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

Study of Applied Physics aims to give an understanding of physical world by observations and predictions. Concrete use of physical principles and analysis in various fields of

engineering and technology is very prominence. The course aims to supplement the factual knowledge gained in the lecture by first hand manipulation of apparatus. This will develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems. In addition, students get necessary confidence in handling equipment and thus learn various skills in measurement.

LIST OF PRACTICALS /ACTIVITIES (To perform minimum 10 practicals).
1. To measure length, radius of a given cylindrical object (test tube and beaker) using a Vernier Caliper and find volume of each object.
2. To determine diameter of a wire and thickness of cardboard using a screw gauge.
3. To find the co-efficient of friction between wood and glass using a horizontal board.
4. To determine force constant of a spring using Hooke's Law.
5. To find the moment of inertia of a fly wheel.
6. To find the viscosity of a given liquid (Glycerine) by Stoke's law.
7. Tomeasureroomtemperatureandtemperatureofahotbathusingmercurythermometer and convert it into different scales.
8. To determine focal length and magnifying power of a convex lens.
9. To measure wavelength of a He-Ne/diode laser using a diffraction grating.
10. To verify Ohm's law by plotting graph between current and potential difference.
11. To verify laws of resistances in series and parallel combination.
12. To draw V-I characteristics of a semiconductor diode and determine its knee voltage.

Total: 30 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1   Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, etc.) for determining dimensions of physical quantities and make measurements with accuracy and precision.
CO2   Appreciate role of friction and measure co-efficient of friction between different surfaces.
CO3   Describe and verify Hooke's law and determine force constant of spring body.
CO4   Determine M.I. of a rotating body(flywheel)
CO5   Determine viscosity of a given liquid by stoke's law
CO6   Measure temperature under different conditions and different scales of temperature measurements.
CO7   Apply knowledge of optics to determine focal length and magnifying power of optical lenses.
CO8   Work with laboratory lasers and measure the wavelength of the light emitted from a laser.
CO9   Verify Ohm's law for flow of current.
CO10   Quantify resistances and verify laws of series and parallel combination of resistances.

REFERENCE BOOK

1   Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
2   Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications(P)Ltd.,
3   Practical Physics by C. L. Arora, S. Chand Publication.
4   e-books/e-tools/ learning physics software/YouTube videos/websites etc.

ES108: INTRODUCTION TO IT SYSTEMS LAB

L	T	P	C
0	0	2	1

COURSE OBJECTIVES

This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Systems' and become proficient in using computing environment basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

S. No.	Topics for Practice
1	Browser features, browsing, using various search engines, writing search queries
2	Visit various e-governance/Digital India portals, understand their features, services offered
3	Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
4	Install Linux and Windows operating system on identified lab machines, explore various options, do it multiple times
5	Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6	Practice HTML commands, try them with various values, make your own Webpage
7	Explore features of Open Office tools, create documents using these features, do it multiple times
8	Explore security features of Operating Systems and Tools, try using them and see what happens.
This is a skill course. More you practice, better it will be.	

Total: 30 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

- Comfortably work on computer, install and configure OS, assemble a PC and connect it to external devices, write documents, create worksheets, prepare presentations, protect information and computers from basic abuses/attacks

REFERENCE BOOK

1   Online resources, Linux man pages, Wikipedia.
2   R.S. Salaria, Computer Fundamentals, Khanna Publishing House.
3   Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing

House.

4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and

5. Shell programming, by Mokhtar Ebrahim, Andrew Mallett.

6. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme,

7. CISC Press, Pearson Education.

8. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

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ES110: FUNDAMENTALS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB

		L	T	P	C
COURSE OBJECTIVES		0	0	2	1

The practical in this section are PrOs (i.e. sub-components of the COs) to be developed and assessed in the student for the attainment of the competency.

S. No	Practical Outcomes (PrOs)	Approx. Hrs
1	Determine the permeability of magnetic material by plotting its B-H curve	02*
2	Measure voltage, current and power in 1-phase circuit with resistive load	02*
3	Measure voltage, current and power in R-L series circuit.	02*
4	Determine the transformation ratio (K) of 1-phase transformer	02
5	Connect single phase transformer and measure input and output quantities	02
6	Make Star and Delta connection in induction motor starters and measure the line and phase values.	02
7	Identify various passive electronic components in the given circuit	02
8	Connect resistors in series and parallel combination on bread board and measure its value using digital multimeter.	02
9	Connect capacitors in series and parallel combination on bread board and measure its value using multimeter	02*
10	Identify various active electronic components in the given circuit	02
11	Use multimeter to measure the value of given resistor	02
12	Use LCR-Q tester to measure the value of given capacitor and inductor	02
13	Determine the value of given resistor using digital multimeter to confirm with colour code.	02*
14	Test the PN-junction diodes using digital multimeter.	02*
15	Test the performance of PN-junction diode.	02
16	Test the performance of Zener diode	02

17	Test the performance of LED.	02
18	Identify three terminals of a transistor using digital multimeter	02
19	Test the performance of NPN transistor.	02*
20	Determine the current gain of CE transistor configuration	02
21	Test the performance of transistor switch circuit.	02
22	Test the performance of transistor amplifier circuit	02
23	Test Op-Amp as amplifier and Integrator	02
	Total	46

Total 30 Hours

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Understand basic principle and operation of electric circuits and machines.

CO2   Solve basic problems related to electrical circuits and machines. Explain the operation of different electrical technologies.

CO3   Demonstrate an understanding of the control systems.

CO4   Understand the basic circuit elements

CO5   Understand different types of signal waveforms.

CO6   Understand logic gates and apply them in various electronic circuits.

CO7   Understand the basic concepts of op-amps, and their applications.

CO8   Use relevant electric/electronic protective devices safely.

REFERENCE BOOK

1   Ritu Sahdev, Basic Electrical Engineering, Khanna Publishing House, 2018

2   Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5

3   Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353

4   Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN: 9788121924405

5   Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN: 9788121924375

6   Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513

7   Sedha, R.S., A TEXT BOOK of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978- 8121927833

8   Malvino, Albert Paul, David, Electronics Principles, McGraw Hill Eduction, New Delhi,2015, ISBN-13: 0070634244-978

9   Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014, ISBN-13-9788121924504

10   Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, New Delhi 2015 ISBN : 9780195425239

11   en.wikipedia.org/wiki/Transformer

12 www.animations.physics.unsw.edu.au//jw/AC.html
13 www.alpharubicon.com/altenergy/understandingAC.htm
14 www.electronics-tutorials
15 learn.sparkfun.com/tutorials/transistors
16 www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
17 www.technologystudent.com/elec1/transis1.htm
18 www.learningaboutelectronics.com
19 www.electrical4u.com

ES112: ENGINEERING MECHANICSLAB

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

1 To obtain resultant of various forces.
2 To calculate support reactions through conditions of equilibrium for various structures.
3 To understand role of friction in equilibrium problems.
4 To know fundamental laws of machines and their applications to various engineering problems.

List of Practical to be performed:

1 To study various equipments related to Engineering Mechanics.
2 To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3 To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4 Derive Law of machine using Worm and worm wheel.
5 Derive Law of machine using Single purchase crab.
6 Derive Law of machine using double purchase crab.
7 Derive Law of machine using Weston's differential or wormed geared pulley block.
8 Determine resultant of concurrent force system applying Law of Polygon of forces using force table.
9 Determine resultant of concurrent force system graphically.
10 Determine resultant of parallel force system graphically.
11 Verify Lami's theorem.
12 Study forces in various members of Jib crane.
13 Determine support reactions for simply supported beam.
14 Obtain support reactions of beam using graphical method.
15 Determine coefficient of friction for motion on horizontal and inclined plane.
16 Determine centroid of geometrical plane figures.

Total: 30 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1 Identify the force systems for given conditions by applying the basics of mechanics.
CO2 Determine unknown force(s) of different engineering systems.

CO3   Apply the principles of friction in various conditions for useful purposes.

CO4   Find the centroid and centre of gravity of various components in engineering systems.

CO5   Select the relevant simple lifting machine(s) for given purposes.

TEXT BOOK
1. Bedi D.S., Engineering Mechanics, Khanna Publishing House
2. Khurmi, R.S., Applied Mechanics, S.Chand & Co. New Delhi.
3. Bansal R K, A TEXT BOOK of Engineering Mechanics, Laxmi Publications
4. Ramamrutham, Engineering Mechanics, S.,S Chand & Co. New Delhi.

REFERENCE BOOK
1. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
2. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge University Press.
3. Meriam, J. L., Kraige, L.G. , Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

SEMESTER III

HTPC201: TEXTILE FIBERS

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to learn about
1. The fundamental concepts of polymerisation and fibre spinning techniques
2. The classification of fibres and fibre structure
3. The natural vegetable fibres, manufacture of regenerated fibres, properties and uses
4. The natural polyamide and manufacture of synthetic polyamide fibres, properties and uses
5. The manufacture of synthetic fibres, properties and uses

Unit 1   POLYMER TO FIBRE CONVERSION   9

Terminologies: repeat unit, mer-weight, polymerisation, degree of polymerisation, polymer molecular weight; Polymerization – Techniques; classification of polymers - Homo polymer, Co - polymer, Atactic, Syndotactic and Isotactic polymer, Man-made fibre spinning techniques – Melt and solution spinning techniques, Polymer selection and preparation. Post spinning operation - drawing, types of heat setting, influence of heat setting on fibre behaviour; Spin finish composition and application; Brief study of principles of Draw and Air – jet Texturising

Unit 2   BASICS OF TEXTILE FIBRE   9

Definition of Textile Fibres, Classification of fibres; study of morphological structures of fibres; Terminology related to Fibres: Introduction to common forms of textile fibres; staple

fibre, filament tow UDY, POY and FOY; Dope dyed and delustered fibres. Types of yarn – spun, continuous filament, mono filament, and multi filament, flat and textured yarn – single, ply and cabled yarns; Physical properties of fibres - Essential and desirable properties of Textile Fibres. Order and disorder of fibres - Concept of Crystallinity and Orientation

Unit 3   CELLULOSE FIBRES   9
Natural vegetable fibres – Cotton, linen, jute and hemp - chemical composition - physical and chemical properties - uses. Regenerated fibres – Viscose and, polynosic rayon fibres manufacturing process, physical and chemical properties uses.

Unit 4   POLYAMIDE FIBRE   9
Silk – Life cycle of silk worm, types of silk, rearing, reeling, spun silk producing techniques, throwing and weighting. chemical composition, physical and chemical properties and uses. Wool - Varieties, grading, fibre extraction, chemical composition, physical, chemical and properties and uses. Nylon6, Nylon 66 – manufacturing process, physical, chemical properties and uses

Unit 5   SYNTHETIC FIBRES   9
Polyester, polyethylene, polypropylene, acrylic - manufacturing process, physical, chemical properties and uses. Introduction to aromatic polyamides - manufacturing process, physical, chemical properties and uses

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1   Define terminologies related to polymerisation and explain different spinning techniques
CO2   Categorize textile fibres and concept of fibre structure
CO3   Explain the cultivation, properties, uses of natural cellulosic and manufacturing of regenerated cellulose fibres, properties and uses
CO4   Describe the production process, properties and uses of polyamide fibres
CO5   Discuss the manufacturing processes, properties, uses of synthetic fibres and principles of texturizing

TEXT BOOK
1   Gupta, V.B., Kothari, V.K., Manufactured Fibre Technology, Springer Netherlands, 1997
2   S P Mishra, Fibre Science and Technology, New-Age International Ltd...New Delhi, 199
3   Vaidya A A, Production of Synthetic Fibres, Prentice Hall of India, New Delhi, 1988

REFERENCE BOOK

1 Cook Gordon J, Hand Book of Textile fibre, Vol.I and II, , WoodheadFibre Science series, UK, 1984
2 Ed. M Lewin and E M Pearce, Hand Book of Fibre Chemistry, Mercel Dekker Inc., 1998
3 Shenai V A, TextileFibre, Sevak Publications, Mumbai
4 R.W. Moncrieff, Manmade Fibres, , Butterworth, London
5 Gowariker V R, Viswanathan N V and Sridhar J, Polymer Science, , New Age International Ltd., New Delhi, 1996

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HTPC202: YARN MANUFACTURING TECHNOLOGY

	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To enable the students to learn about

1 Basic principles and method of working of various machinery involved in various fiber preparatory process involved in yarn manufacturing process.
2 Principles and method of working of ring spinning process and post spinning processes
3 Calculation of production, draft, twist and other particulars pertaining to yarn manufacturing process

Unit 1 INTRODUCTION TO GINNING AND BLOWROOM   9
PROCESSES

Process flow chart of carded and combed yarns; Objective, description and working of different types of Gins; Objectives, principles and description of opening, cleaning and blending machines used in blow room; Lap feed and chute feed systems; cleaning efficiency and production calculations in blow room.

Unit 2 CARDING PROCESS   9

Objectives of carding - carding action - stripping action - passage of material through high production card; Description and functions of mote knives, under casing, back plate, front plate, flats, heel and toe arrangement; Web doffing systems; Coiler mechanism - functions - types of coilers; Auto levellers to enhance the quality of sliver – principles and working ; Carding machine production calculations.

Unit 3 COMBING PROCESS   9

Objectives and advantages of combing process; Lap preparation techniques - Comber lap preparatory machines – Description and passage of material through sliver lap machine, ribbon lap machine and super lap formers; Passage of material through a modern comber - operations of combing cycle (Feeding, nipping, combing, detaching and top combing) - forward feed - backward feed –half lap – unicomb - piecing wave - Production calculation in preparatory to combing and combing machines

Unit 4   DRAW FRAME AND SPEED FRAME   9

Objectives of draw frame; Description of draw frame and passage of material through a high speed draw frame; drafting systems used in modern draw frames; auto-levelling - open loop and closed loop auto levellers; draft and production calculations in draw frame; Speed frame - Objectives - description and passage of material; Draft, Twist and Production calculations in speed frame

Unit 5   RING SPINNING, BUNDLING AND BALING   9
          PROCESSES

Ring spinning - Principle of yarn formation – description and passage of material through ring spinning machine - design features and functions of important elements of ring spinning machine; modern developments in ring spinning machines; draft, twist and production calculations in ring spinning machine; Reeling - Objectives description and working principle of the Reeling Objectives – Bundling and Baling - description and working principle of the bundling and baling presses

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Describe the function and mechanism of ginning machine and, opening and cleaning machines

CO2   Explain the carding process, working of carding machine and functions of various parts

CO3   Explain the importance of combing processes in enhancing the quality of yarn produced.

CO4   Illustrate principle and working of draw frame and speed frame machines

CO5   Illustrate principles and working of ring spinning process and post spinning machines.

TEXT BOOK

1   Oxtoby E., "Spun Yarn Technology ". Butterworth. London, 1987

2   Klein W., "The Technology of Short-staple Spinning ", The Textile Institute, Manchester. 1998

3   Klein W., "A Practical Guide to Opening and Carding ". The Textile Institute, Manchester, 1999.

4   Klein W., "A Practical Guide to Combing, Drawing and Roving Frame ", The Textile Institute, Manchester, 1999

REFERENCE BOOK

1   Peter R Lord, "Handbook of Yarn Production: Technology, Science and Economics ", The Textile Institute, Manchester, 1999. Woodhead Publishing Ltd. And CRC Press LLC 2003.

2   Salhotra K.R. and Chattopadhyay R., "Book of papers on Blowroom and Card ", Indian Institute of Technology, Delhi, 1998.

3 Iredale J., "Yarn Preparation: A Handbook ", Intermediate Technology, 1992.

4 Indhira Doraiswamy, Chellamani P. and Pavendhan A., "Cotton Ginning, Textile Progress",The Textile lnstitute. Manchester, 1993.

5 Wyme.A, Textiles, The Motivate series, Macmillan Texts for Industrial Vocational and Technical Education, Germany.

6 Hannelore Eberie et al., Clothing Technology – Fibre to Fabric, Verlag Europa-Lehermittel, Nourney, Volmer GmbH & Co., Germany, 1996.

7 Sara J. Kadolph and Anna L. Langford, Textiles, Prentice Hall of Idia Limited, New Delhi, 2002

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HTPC203 : HANDLOOM WEAVING TECHNOLOGY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To impart knowledge to students on

1 Identification of yarn packages and preparation of size recipe.

2 Basic terms, specifications and functions of weaving preparatory process and handloom machines

3 Basic mechanisms of handloom weaving process.

4 Count of yarns in different system of yarn numbering and conversion of one system to other.

5 Calculation of folded yarn count and various reed counts.

Unit 1 WEAVING PREPARATORY PROCESS   9

Different forms of yarn packages - hanks, cones, cheeses and spools - purpose and use; essential characteristic of warp and weft, yarn preparatory process; warping - peg warping, vertical warping and sectional warping; objective and importance of sizing of cotton yarn, ingredients used in size mixture and their functions, various forms of sizing- hank sizing and street warp sizing; illustrative size recipe for cotton, viscose and polyester - cotton blends; ideal sizing, common defects during sizing- causes and remedies.

Unit 2 HANDLOOMS AND SHED FORMATIONS   9

Evolution of handlooms - various parts of a handloom and their functions, types of handlooms - throw shuttle handloom, fly shuttle handloom, pit loom & frame loom; passage of warp in a fly shuttle handloom; motions of a handloom - primary, secondary & auxiliary motions; Different types of shed formations – centre closed shed, bottom closed shed, top closed shed, open shed and semi open shed; shedding mechanism of a handloom using treadles and heald reversing motions – roller system, pulley reversing system and jack and lam rod system.

Unit 3 PRIMARY AND SECONDARY MOTIONS OF 9
    HANDLOOMS

Handloom dobbies – lattice dobby, barrel dobby and bottom closed shed dobby – mechanism, working principles and suitability; design and essential features of a pit loom.

Picking mechanism of a handloom, types of shuttles – throw shuttle, fly shuttle and roller shuttle, design and suitability; beat up - closed shed beating and crossed shed beating, different types of reed – bamboo reed, pith bound, steel reed and all metal steel reed, suitability for various fabrics; let off motion in handlooms – ratchet and pawl, rope and weight, rope-lever and weight; take up motion in handloom – poker rod and ratchet & pawl; auxiliary motions of a handloom – temple motion and terry motion;

| Unit 4 | YARN NUMBERING SYSTEMS AND ITS CONVERSIONS | 9 |

Introduction to numbering of yarns; indirect system of numbering of yarns – New English cotton, spun silk and spun rayon, New French, metric, worsted, woolen Yorkshire, linen, direct system of numbering of yarns – Denier and flax/ jute/ hemp -Evolution of universal system of numbering – tex and its derivatives - millitex, kilotex;

Determination of conversion factors, conversion of count of yarn -indirect to indirect, conversion of count of yarn -direct to direct, conversion of count of yarn - indirect to direct, conversion of count of yarn - direct to indirect.

| Unit 5 | FOLDED YARN COUNTS AND REED COUNT SYSTEMS | 9 |

Expression of count of folded yarns, contraction due to twisting, determination of Equivalent/Resultant count of folded yarns, amount of component threads in folded yarn, average count of warp, combination of different counts, material and system of counting; Reed Count, dents per linear space and groups of dents per linear space models, dents per linear space – Stockport-relation between reed count, number of ends per dent, cloth width, reed width and ends per inch- heald count Calculations.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1	Categorize the types of yarn packages and sizing of different kind of yarns.
CO2	Describe different types of handlooms and shed formations
CO3	Explain primary and secondary motions and other mechanisms of handloom
CO4	Calculate different types of yarn numbering systems
CO5	Calculate the folded yarn and various reed count systems

TEXT BOOK

1. Marks. R and Robbinson. A. T. C, "Principle of Weaving", 1976.
2. Talukdar M. K., Sriramulu P. K. and Ajgaonkar D. B, "Weaving Machine, Mechanism, Management",1998.
3. Banerjee N.N, "Weaving Mechanism", 1982.
4. Sengupta, "Weaving Calculation", 1963.
5. Ormerod. A and Sondhelm .W. S., "Weaving – Technology and Operations", 1995.
6. Goordev.V, "Cotton Weaving", 1979.
7. TAI, "Weaving Tablets", 2013.

8   Lord.P.R and Mohamad, "Weaving: Conversion from yarn to Fabric", 1982.

REFERENCE BOOK
1   Hanton, WA, "Mechanics for Textiles Student an Introduction to the study of mechanics for Textiles student", 1960.
2   Greenwood, Hony., "Hand book of weaving and manufacturing", 2nd Edition, 1954.
3   Rama Verma, "Handloom weaving", 1959.
4   David Ezakia, "Preparatory Process for weaving with calculation: including Development of the modern Power Loom".
5   Z Grosicki, "Watsons Textile Design and Colour ", 2nd Edition

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HTPC204 : FABRIC STRUCTURE- I

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To impart knowledge to students about
1   The classification of woven fabrics
2   The concept of design elements and features of basic weaves.
3   The construction of different kinds of basic weave structures
4   Toweling, fancy fabric weaves and colour and weave effect

Unit 1   INTRODUCTION TO TEXTILE DESIGNING   9

Classification of textile fabrics; classification of woven fabrics - simple, compound and complex; fundamental aspects of woven fabrics-count of graph paper, Methods of representing design on graph paper; Principle of Design, draft, denting, lifting & tie-up plans. Types of draft - straight draft, skipped draft, pointed draft, herring bone draft, mixed draft etc. Plain weave - ornamentation of plain weaves; study of derivative structures of plain weave – regular and irregular warp rib, weft rib, hopsack and basket weaves. Catch-cord technique; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves

Unit 2   TWILL WEAVES AND ITS DERIVATIVES   9

Study of twill weaves up to 12 threads; classification of twills - warp faced twill, weft faced twill and equal faced twill, Left hand twill and Right hand twill; angle of inclination of twill diagonals- Steep twill and Flat twill; influence of the twist direction of yarn over prominence of twill lines; study of derivatives of twill weaves - wavy twill, herringbone, transposed twill, broken twill, elongated twill, combined twill, figured twill– Drafts, lifting plan & tie up, treadling plan for the above designs

Unit 3   DIAMOND AND SATIN WEAVES   9

Diamond weave, twill dice check, diaper; regular and irregular sateen and satin up to 12 threads, satin dice check weaves; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves. Difference between diamond and diaper, satin and sateen.

Unit 4   TOWELLING WEAVES   9

Study of honey comb weaves– ordinary honey comb, stitched honey comb and Brighton's honey comb designs- cell formation; study of Huck-a-Back weave- Construction of Standard Huck- a - Back (10 X 10), Devon's Huck– a– Back ;mock leno and corkscrew weaves. Design, draft, and peg/tie-up plan and thread interlacing diagram of above weaves

Unit 5   FANCY AND COLOUR AND WEAVE EFFECTS   9

Crepe weaves – construction upon sateen base, by combination of floating weaves with plain thread, by reversing and by insertion of one weave over another. Combination of weaves – twill and plain, mock-leno and plain, honey comb and plain, stripe and check effect by these combinations; Introduction to colour and weave effects- continuous line effect, hounds tooth patterns, bird's eye and spot effects, hairline stripes, step patterns and all over effects. Distorted thread effects – salient feature, warp and weft distortion.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Identify and construct plain weave and its derivatives
CO2   Create different twill weave structures and its derivatives
CO3   Draw the designs of Diamond and satin weaves
CO4   Develop woven fabric designs suitable for towels
CO5   Create fabric designs using different color and weave effects

TEXT BOOK

1   Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004.
2   Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989.
3   Grammar of Textile Design by H. NISBET, F.T.I.

REFERENCE BOOK

1   Wilson J., "Handbook of Textile Design", Textile Institute, Manchester, 2001.
2   Horne C.E., "Geometric Symmetry in Patterns and Tilings", Textile Institute, Manchester, 2000.
3   Seyam A. M., "Structural Design of Woven Fabrics, Theory and Practice", Textile Institute, Manchester, 2002.
4   Georner D, "Woven Structure and Design, part 1: Single Cloth Construction", WIRA, U.K., 1986.
5   Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA, U.K., 1989.

HTPC205 : CHEMICAL PROCESSING OF TEXTILES - I

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To make the students understand the process of pretreatments and dyeing of cotton , wool and silk fibres using various dye classes and machineries suitable for the respective process.

Unit 1   PRETREATMENT OF COTTON   9

Need for preparation of grey goods& preparatory process sequence for different process of cotton material.

Singeing, objective & methods of singeing - Gas singing machine description, working, precautions, merits & demerits. Desizing of cotton: objective, methods, special emphasis on Acid & enzyme desizing with merits & demerits. Scouring of cotton: objective, Chemistry, methods of scouring, Bleaching of Cotton: Objective,Chemistry, methods of bleaching, Hypochlorite & H_2O_2 bleaching, OBA Treatment. Mercerization of Cotton: Objective,Chemistry, methods of mercerization, merits and demerits.

Unit 2   DYEING – TERMINOLOGIES AND MACHINES   9

Classification of dyes, Dyeing Terminologies, Dyeing machineries: Kier, J-Box, Jigger, Winch, Padding Mangles, Cabinet Hank dyeing machines, package dyeing machine, HTHP Beam, Jet Dyeing, Soft Flow, Over Flow dyeing machine, Hydro extractor, Vertical Can dryer and Hot Air Stentor.

Unit 3   DIRECT AND REACTIVE DYEING OF COTTON   9

Dyeing cotton with Direct Dyes: Classification, Mechanism, Recipe, Process conditions with procedure. After treatment of direct dyed cotton material: Methods and special emphasis on cationic dye fixing agents.

Dyeing of cotton with Reactive Dyes: Classification, Mechanism, Recipe, Process conditions with procedure for M, H and VS dyes

Unit 4   VAT, AZOIC AND SULPHUR DYEING OF COTTON   9

Dyeing of cotton with Vat Dyes: Classification Mechanism, Recipe, Process conditions with procedure and concepts of Solubilised Vat Dyes. Dyeing of cotton with Azoic Dyes: Mechanism, Recipe, Process conditions with procedure. Dyeing of cotton with Sulphur Dyes: Classification Mechanism, Recipe, Process conditions with procedure, and its common problems viz. Tendering & Bronziness, etc.

Unit 5   PRETREATMENT AND DYEING OF WOOL AND   9
**   SILK**

Pretreatment of Silk: Degumming and its methods, bleaching with H_2O_2.

Dyeing of Silk with Acid & Metal Complex: Classification, Mechanism, Recipe, Process conditions with procedure.

Pretreatment &Setting of wool: Scouring and its methods, Milling, Potting, Crabbing,

Decatising and Bleaching with H_2O_2.

Dyeing of Wool with Acid, Metal Complex, Chrome dyes: Mechanism, Recipe, Process conditions with procedure.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Explain the need and procedure for pre-treatments of cotton materials.

CO2   Classify dyes, define the dyeing terms and select the appropriate machine for the process.

CO3   Explain the process of dyeing cotton with direct and reactive dyes with suitable recipe and process conditions.

CO4   Describe the process of dyeing cotton with vat, azoic and sulphur dyes with suitable recipe and conditions.

CO5   Prepare the suitable recipe and procedure for the pre-treatment and dyeing of silk and wool materials.

TEXT BOOK

1   Chemical Processing of Textiles by Dr. C.V. Kaushik and Mr. Antao Irwin Josico, NCUTE

2   Technology of Scouring and Bleaching, Trotman E.R., Griffin, London, 1968.

3   Technology of Textile processing Vol. II, III & VI by Dr. V AShenai

4   Technology of Dyeing by Dr. V AShenai

5   Guide to Wet Textile Processing Machines by J. N. Shah, Elsevier Science & Technology

REFERENCE BOOK

1   Technology of Bleaching and Mercerizing, Shenai V.A., Sevak Publication, Bombay, Vol. - 3, 3rd edition, 2003

2   Textile Bleaching, Steven A.B., Pitman and Sons, London.

3   Textile Preparation and Dyeing, Asim Kumar Roy Choudhury, Oxford and IBH Publishing Co. Pvt. Ltd., 2006

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HTPC 206 : HANDLOOM WEAVING TECHNOLOGY LAB

	L	T	P	C
COURSE OBJECTIVES	0	0	4	2

To impart knowledge to students on

1   Different parts of handloom and weaving preparatory process

2   Development of design, draft, peg plan and tie up plan for handloom weaving

3   Various processes in weaving to develop the fabric sample

List of Experiments

1   Sketching and familiarizing of different functional parts of handloom.

2   Sketching and practice of various knots and piecing

3   Practice of bobbin and pirn winding

4	Practice of warping on peg warping frame and sectional warping machine
5	Study of preparation of design, draft, peg plan & tie –up plan and practice
6	Practice of drawing-in and denting
7	Practice of gaiting-up.
8	Practice of tie- up and handloom setting.
9	Practice of weaving.
10	Development of samples with Plain weave and its derivatives
11	Development of samples with Twill weave and its derivatives.
12	Preparation of lattice with pegs for handloom dobbies for various weaves

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

- CO1 Sketch and identify the different parts of handloom
- CO2 Perform various weaving preparatory processes.
- CO3 Draw a design, draft and peg-plan for the given fabric sample
- CO4 Adjust the settings of handloom to produce given fabric sample
- CO5 Prepare the lattices for various dobby designs

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HTPC 207 : FABRIC ANALYSIS AND COSTING LAB – I

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

To impart knowledge to students on analysis of weave and fabric particulars

List of Experiments

1	Analysis of weave, constructional details and weaving techniques of fabrics with plain weave
2	Analysis of weave, constructional details and weaving techniques of fabrics with plain weave derivatives for its production
3	Analysis of weave, constructional and weaving techniques of fabrics with different types of twill weaves for its production
4	Analysis of weave, constructional and weaving techniques of fabrics with satin and sateen weaves for its cloth production
5	Analysis of weave, constructional and weaving techniques of honey comb fabrics
6	Analysis of weave, constructional and weaving techniques of Huck a back fabrics

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

- CO1 Draw the structure of woven fabrics with different weaves
- CO2 Extract the weave from the given sample and draw the weave, draft and peg- plan for re-production

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HTPC 208 : CHEMICAL PROCESSING OF TEXTILES LAB - I

	L	T	P	C
COURSE OBJECTIVES	0	0	4	2

To enable the students to perform pre-treatment and dyeing of cotton, wool and silk materials

List of Experiments
1. Desizing of cotton with Acid and Enzyme.
2. Scouring of cotton.
3. Bleaching of cotton with hydrogen peroxide and Hypochlorite
4. Dyeing of cotton with Direct dyes.
5. Dyeing of cotton with Reactive dyes.
6. Dyeing of cotton with Vat dyes.
7. Dyeing of cotton with Azoic dyes.
8. Dyeing of cotton with Sulphur dyes.
9. Study the effect of Liquor Ratio, Electrolytes & Temperature on any one class of dye.
10. Degumming & Bleaching of silk
11. Scouring & Bleaching of Wool
12. Dyeing of Silk & Wool with Acid dyes.
13. Dyeing of Silk & Wool with Metal Complex dyes

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to perform
- CO1 Pretreatments of cotton, wool and silk material.
- CO2 Dyeing of cotton with direct, reactive, vat, azoic and sulpur dyes using appropriate recipe for the given shade
- CO3 Dyeing of wool and silk with acid and metal complex dyes using appropriate recipe for the given shade
- CO4 The analysis of the effect of MLR, electrolyte and temperature on dyeing of cotton.

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SEMESTER IV

HTPC 209: WEAVING TECHNOLOGY - I

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To facilitate the students to learn about the
1. Principle and working of warp winding and pirn winding process.
2. Mechanism and principle of warping & sizing process and related calculations
3. Different primary motions in tappet loom and dobby loom.
4. Various secondary and auxiliary motions
5. Working principle of multiple box motions and production calculation in loom

Unit 1   WINDING   9

Objectives – Passage of yarn and Working principle of Precision winding machines and drum winding machines. Tensioning devices – Mechanical yarn clearer- slub catcher: fixed blade, adjustable blade, spring type. Electronic yarn clearer; photo-electric and capacitance type – Splicing; difference between knotting and splicing. Ribbon breaking devices. Objectives – Working principle of pirn winding machines - characteristics of pirn package. Yarn & Package faults. Yarn winding calculations – cone, cheese and pirn– efficiency, production and production planning.

Unit 2   WARPING AND SIZING   9

Modern high speed beam warping machine – mechanism and working principle, Sectional warping machine – mechanism and working principle. Working principle of Multi cylinder sizing machine. Mill warping calculations – efficiency, production, creel capacity, number of back beams, amount of yarn, wastage and production planning; Sectional warping calculation – creel capacity, no of sections, no of patterns per sections, width of warp and total no of ends; Sizing calculations – size pick up, efficiency, production and production planning

Unit 3   POWERLOOM WEAVING   9

Introduction to power loom – primary, secondary and auxiliary motions of a power loom; tappet shedding and reversing motions - early shedding, late shedding; designing of tappets for plain and 4 thread twill weaves; powerloom dobby – climax dobby, mechanism and working principle, lattices and pegging. Picking mechanism – scope of over-pick and under-pick mechanism, cone over-pick mechanism – mechanism and working principle; under-pick mechanism – mechanism and working principle, parallel motion, early picking and late picking.

Unit 4   BASIC AUTOMATION IN POWERLOOM   9

Beat-up mechanism – eccentricity of sley, timing and synchronization of primary motions; seven wheel take up motions; negative let-off motion. Warp protective motions – loose reed and fast reed motions, mechanism and working principle; weft detection motions – side weft fork and centre weft fork motions, mechanism and working principle. Temples – necessity and types of temples.

Unit 5   AUTOMATIC POWERLOOM   9

Multiple box motion; drop box – mechanism and working principle; automatic powerlooms – introduction; mechanical warp stop motion; weft replenishment mechanism - shuttle changing & cop changing mechanisms; Fabric production calculations of automatic powerlooms, preparation of lay-out for a loom shed.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Discuss the concept and mechanism of warp winding and weft pirn winding.

CO2   Explain the mechanism and principle of warping & sizing process and estimate size pick up and production.

CO3   Summarize the working mechanism of primary motions in tappet and dobby loom

CO4   Elaborate the various secondary and auxiliary motions in power loom

CO5   Demonstratethe drop box motion, stop motions and production calculations in power loom.

TEXT BOOK

1. Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989.
2. Sabit Adanur, "Handbook of Weaving", Technomic Publishing Co. Inc., 2001
3. Ormerod A. and Sondhelm W.S., "Weaving: Technology and operations", Textile Institute, 1995.

REFERENCE BOOK

1. Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., "Weaving: Machines, MechanismsManagement", Mahajan Publishers, Ahmedabad, 1998.
2. Booth J.E., "Textile Mathematics Volume 3", The Textile Institute, Manchester, 1977.
3. Lord P.R. and Mohamed M.H., "Weaving: Conversion of Yarn to Fabric", Merrow, 1992.
4. Vangheluwe L., "Air- Jet Weft Insertion", Textile progress, Vol. 29, No. 4, Textile Institute Publication, 1999.

HTPC210 : FABRIC STRUCTURE- II

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

To impart knowledge to students on

1. Multi-layer fabrics and their production.
2. Construction of weave, draft, peg plan for the production of compound and complex structures
3. Design preparation suitable for figured single cloth jacquard weaving

Unit 1   CORDED AND RIB STRUCTURES   9

Bedford cord weaves – salient features, plain faced Bedford cord (regular and alternate pick principle), twill faced bed ford cord, wadded bed ford cord, and crepon Bedford cords. Welt & Pique structures – salient features and manufacturing techniques, ordinary structure, wadded structure (loose back and fast back); Difference between welts and piques, Difference between Bedford cord and welt. Design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

Unit 2   DOUBLE LAYER CLOTH AND ITS TYPES   9

Double cloth – classification, Step by step construction of self-stitched double cloth, reversible and non-reversible varieties using twill, sateen and satin; Centre stitched double cloth; double width plain cloth, plain Tubular cloth. Thread interchanging double cloth-

warp thread interchanging double cloth ,weft thread interchanging double cloth, Cloth interchanging double cloth using plain and twill weaves; Stripes and check effects using cloth interchanging principle; wadded double cloth – warp wadding and weft wadding. Design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

Unit 3   TREBLE CLOTH AND BACKED CLOTH   9
Treble width plain cloth – interlacement diagram and its graphical representation; Treble cloth using twill, satin, and sateen. Backed cloths- warp & weft backed cloths-warp wadded and weft wadded backed cloth-Reversible and non-reversible using twill, sateen and satin - Imitation backed cloth, imitation warp and weft backed cloths. Design, draft, denting, peg/tie-up and thread interlacing diagram of above weaves.

Unit 4   COMPOUND WEAVE STRUCTURE- PILE WEAVE   9
Pile fabrics – Salient features, classification of pile fabrics- loop pile and cut pile; warp pile and weft pile. Terry piles – salient features, terry mechanism; classification of terry pile structures – 3 pick, 4 pick, 5 pick and 6 pick terry, graphical representation and thread interlacement diagram. Basic principles and weaves of warp pile fabrics produced with the aid of wires and face to face weaving. Construction of Weft pile designs - Construct Plain back, Twill back pile designs, Corded velveteen- design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

Unit 5   INTRODUCTION TO COMPLEX WEAVES AND   9
          JACQUARD FIGURED DESIGN
Principles of Cross weaving-Various types of sheds formed in cross weaving - Construction of plain gauze & leno – Drafting, lifting plan, thread diagram & graphical representation. Construction of extra warp and extra weft designs - Importance of extra warp and extra weft figuring in ornamentation of fabrics. Introduction of Construction and development of jacquard designs. Count of graph paper- Factors influencing the selection of appropriate count of graph paper. Study of Figured single cloth - structure of cloth with different weaves combination-Design development and punching process by using straight tie and straight draft

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
- CO1   Sketch corded and rib structures using basic weaves
- CO2   Create double cloth structures using different methods
- CO3   Construct treble cloth and backed cloth structures
- CO4   Select different weaves to produce compound fabric structures
- CO5   Develop the designs for complex fabric structures

TEXT BOOK
1   Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004.
2   Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II,

Butterworths, London, 1989.

3 Grammar of Textile Design by H. NISBET, F.T.I.

REFERENCE BOOK

1 Geormar D. Woven Structure and Design Part I Single Cloth Construction WIRA UK 1986

2 Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA,U.K., 1989.

3 X. Chen,M. Spola,J. Gisbert Paya &P. Mollst Sellabona1,Experimental Studies on the Structure and Mechanical Properties of Multi-layer and Angle-interlock Woven Structures, Pages 91-99

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HTPC211 : CHEMICAL PROCESSING OF TEXTILES – II

	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To facilitate the students to understand

1 the process of pretreatments and dyeing of polyester materials, dyeing defects and its remedies,

2 various methods and styles of printing

3 recipe and procedure for direct style printing on cotton ,silk and polyester various mechanical and chemical finishes

Unit 1   PRETREATMENT AND DYEING OF POLYESTER   9

Pretreatment of Polyester: Scouring and bleaching with sodium chlorite. Heat Setting: Objective & Methods. Dyeing of Polyester with Disperse dyes: Mechanism, Recipe, Process conditions with procedure for Carrier, HTHP & Thermosol dyeing. Dyeing defects, damages and their remedies.

Unit 2   INTRODUCTION TO PRINTING   9

Textile Printing: Differences in Dyeing and Printing, Printing paste ingredients and their functions. Methods of printing viz. Block Printing, Screen Printing, Rotary and Flatbed Screen Printing and Transfer Printing with their merits and demerits. Brief outlines of Styles of Printing viz. Direct, Resist and Discharge Printing. Traditional styles of Printing viz. Tie & dye, Kalamkari and Batik printing. After Treatments in printing: Steaming, Ageing and Curing.

Unit 3   DIRECT STYLE OF PRINTING   9

Printing of cotton with Direct dyes, Reactive dyes in direct style: recipe & Procedure.
Printing of cotton with Pigments: recipe & Procedure
Printing of Silk with Acid dyes: recipe & Procedure
Printing of Polyester with Disperse dyes: recipe & Procedure

Unit 4   INTRODUCTION AND MECHANICAL FINISHES   9
Textile Finishing: Object & factors affecting selection of finishes.
Classification: Mechanical and Chemical Finishes, Temporary and Permanent Finishes.
Mechanical Finishing: Calendaring, Sanforizing, Raising or Napping, Shearing and Sueding.

Unit 5   CHEMICAL FINISHES   9
Chemical finishing: Wrinkle-resist finishing, Softening, Stiffening, Waterproof, water repellent, Soil repellency, soil release, Antistatic, flame retardant and flame resistant finish

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1   Explain the process of pre-treatment and dyeing of polyester fabrics.
CO2   Describe various methods and styles of printing and select suitable print paste ingredients for the printing process.
CO3   Explain the process of direct style of printing of various fabrics with suitable recipe and procedure.
CO4   Classify textile finishes; explain the process of calendaring and sanforising
CO5   Summarize the various chemical finishing treatments.

TEXT BOOK
1   Textile Dyeing by Dr. N. N. Mahapatra, Woodhead Publishing India in Textiles.
2   Chemical Processing of Textiles by Dr. C.V. Kaushik and Mr. Antao Irwin Josico, NCUTE
3   An Introduction to Textile printing by W Clarke.
4   Textile Finishing by R. S. Prayag
5   Technology of Textile Finishing by Dr. V.A. Shenai.

REFERENCE BOOK
1   Handbook of Textile processing machinery – R.S. Bhagwat1999
2   Dyeing and Chemical Technology of Textiles Fibres by E.R. Trotman
3   Chemical Finishing of Textiles by W.D. Schindler and P.J. Hauser.
4   A Handbook of Textile Finishing by A.J. Hall
5   Principles of Textile Finishing by Asim Kumar Roy choudhury

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HTPC212 : TEXTILE TESTING – I

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to learn about
1   Sampling methods for testing of textile materials.
2   The moisture properties of textiles and its measurement.
3   The Determination of fibre length, fineness and maturity properties

| 4 | The Determination of tensile properties of fiber and yarn. |
| 5 | The determination of Yarn count, Twist and mass evenness |

Unit 1   SAMPLING   9

Definition of quality- importance of quality assessment- selection of samples for quality assessment – random and biased samples – squaring technique and zoning technique for fibre Selection; Yarn sampling - use of random numbers - sampling for various types of yarn tests

Unit 2   MOISTURE RELATED PROPERTIES OF TEXTILES   9

Atmospheric conditions - absolute humidity, relative humidity, standard atmospheric testing conditions; Measurement of atmospheric conditions - Instruments used for determination of Relative Humidity – Wet and dry bulb hygrometer; Concept of Moisture Regain and Moisture Content – Relation between Regain and Content- Corrected yarn count in standard regain value; Effect of Moisture on fibre properties – Factors affecting Moisture Regain of textile materials – Standard regain value of textile fibres ; Methods of Measurement of Moisture Regain and Moisture Content -Moisture Testing Oven

Unit 3   FIBER LENGTH, FINENESS AND MATURITY   9

Fibre testing, the fibre quality index and spinnablity; Fibre length and length uniformity measuring techniques. Fibre fineness – definition - its importance in yarn manufacture; measurement techniques. Cotton fibre maturity, estimation by microscopic method - maturity ratio and index, estimation by other methods – optical, air flow differential dyeing; its importance in spinning.

Unit 4   TENSILE PROPERTIES OF FIBER AND YARN   9

Tensile testing of Textiles – Introduction – Terminology and definitions; The Load and elongation curve – The stress and strain curve. Tensile strength testing modes – CRT, CRE and CRL; Factors affecting the test results obtained from testing instruments. Fibre strength measurement – stelometer; Pendulum lever principle (CRT) – single yarn strength tester, Inclined plane principle (CRL) - Scott IP Tester, Strain gauge principle (CRE) – Lea strength – CSP, merits & demerits.

Unit 5   YARN COUNT, TWIST AND MASS EVENNESS   9

Count measuring systems. Measurement of Yarn Count - weighing balance method, Knowles balance, Quadrant balance, Beasley's balance. Significance of Yarn Twist - Twist direction - Twist factor and Twist Multiplier. Twist angle - function of twist in yarn structure – Twist and yarn strength – Effect of twist on fabric properties; Measurement of twist using Straightened fibre method, Twist contraction method. Yarn mass evenness parameters – measurement – electronic mass evenness determination – Yarn fault classification

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Use sampling methods for textile materials
CO2 Describe moisture and its effect and relation with other properties of textile material.
CO3 Analyse fibre length, fineness and maturity properties and their measurement
CO4 Determine the tensile strength of fiber and yarn
CO5 Explain significance of yarn count, twist and evenness and their measurement.

TEXT BOOK

1 Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2 Saville B.P., "Physical Testing of Textiles", Textile Institute, Manchester, 1998
3 Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
   4. Amutha, K., A Practical Guide to Textile Testing. CRC Press, 2016.

REFERENCE BOOK

1 Ruth Clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000
2 Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998
3 Sara J. Kadolph., "Quality Assurance for Textiles and Apparels", Fair child Publications, New York,1998
4 Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993
5 Textile testing web course content https://nptel.ac.in/courses/116/102/116102029/#

HTPC 209 : COLOUR CONCEPTS AND TEXTILE DESIGN LAB

	L	T	P	C
COURSE OBJECTIVES	0	0	2	1

To impart knowledge to students on
   Drawing small figures and motifs, Colour theory and its effect on weaves and Arrangement of motifs with different bases

List of Experiments
1 Practice on drawing types of Lines
2 Practice on drawing direction of Lines
3 Practice on Variation of Lines
4 Practice on foliage drawing like small plants, flowers and creepers
5 Practice on developing traditional motifs like birds, animals and flowers
6 Prepare Colour Wheel (Primary, Secondary and Tertiary Colours)
7 Practice chart for colour schemes
   - Monochromatic
   - Analogous
   - Achromatic
   - Complementary colour
     - Single Complementary

- Double Complementary
- Split Complementary
  - Triadic
8 Create Simple colour & weave effects in design paper by applying colour schemes for the following
   - stripes
   - checks
   - step pattern
   - Hound's-tooth patterns
9 Apply colour schemes for special colour and weave effects for rib and corkscrew weaves
10 Apply colour schemes for figured colour and weave effects for the following
   - Simple and compound order of colouring
   - Distinct figured effects
11 Arrange motifs or figures in different bases for drop device and drop reverse design
   - Diamond base, Ogee base, Diagonal wave line base and Rectangular base
12 Arrange motifs or figures in different bases for Sateen system of distribution
   - Regular and irregular sateen arrangement
   - Layout preparation for shirting, Dothi, saree and chudidar

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
   CO1   Draw different lines and apply in designing motifs
   CO2   Apply the Light and pigment colour concepts in design development
   CO3   Create different colour and weave effects

HTPC214: WEAVING TECHNOLOGY LAB

		L	T	P	C
COURSE OBJECTIVES		0	0	4	2

To facilitate the students to learn about
   1   Operation and working of various weaving preparatory machines.
   2   Fabric samples development for basic weaves on handloom
   3   Erection and setting of basic weaving mechanisms practically
   4   Samples development for saree and dhoti borders using handloom dobby.

List of Experiments
   1   Study the material passage, setting of tensioners, slub catchers and production calculation in cone winding machine.
   2   Study the material passage and production calculation in pirn winding machine.
   3   Study the material passage and production calculation in warping / sectional warping machine.
   4   Development of samples with satin/ sateen weaves on handlooms
   5   Development of samples with diamond, honey comb, diaper weaves on handlooms.

6. Development of samples with mock leno and huck-a-back weaves on handlooms.
7. Development of samples with distorted tread effect, backed cloth etc., on handlooms
8. Sketching and acquiring knowledge of different functional parts of Power loom.
9. Practice of erection and setting of tappet shedding mechanism
10. Practice of erection and setting of over-pick and under-pick mechanisms
11. Practice of erection and setting of beat-up mechanism and control of sley eccentricity.
12. Study of let-off mechanisms.
13. Practice of erection and setting of 5 and 7 wheel take-up mechanisms.
14. Study of weft fork and weft replenishment mechanisms in shuttle looms
15. Study of warp protector mechanism.
16. Creation of designs suitable for saree borders and dhoti borders using handloom dobbyies.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Predict slub catcher and tensioner settings for various linear density and calculate production in cone winding.

CO2 Estimate and calculate production in pirn winding and warping machines

CO3 Create fabric samples for various basic weaves on handloom using 5 to 8 shafts.

CO4 Show and practice dismantling, assembling and setting of various primary, secondary and auxiliary motions in power loom.

CO5 Develop sample for saree and dhoti borders using handloom dobby

-

HTPC 215 : CHEMICAL PROCESSING OF TEXTILES LAB - II

	L	T	P	C
COURSE OBJECTIVES	0	0	4	2

To enable the students to

1. perform dyeing of polyester,
2. perform direct, discharge and resist style of printing
3. perform Identification of dyes in powder and dyed material
4. perform Stiffening and softening finish
5. Understand the computer colour matching process.

List of Experiments

1. Dyeing of polyester with disperse dyes.
2. Printing of Cotton in direct style with Direct & Reactive dyes using Blocks & Screens.
3. Printing of Polyester in direct style with Disperse dyes using Blocks & Screens.
4. Printing of Cotton & Polyester in direct style with Pigment Colours using Blocks & Screens.
5. Printing of Cotton in White Discharge Style on Direct & Reactive dye using Blocks & Screens.

6	Tie & Dye style of printing
7	Batik style of printing.
8	Identification of dyes in powder form.
9	Identification of dyes in dyed material
10	Application of stiffening agent.
11	Application of Reactive / Silicone Softeners
12	Demonstration on Computer Colour Matching.
13	Calibration, K/S Data generation & Evaluation of whiteness index.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Conduct dyeing of polyester using disperse dye for the given shade with appropriate recipe.

CO2 Conduct direct, discharge and resist style of printing using blocks and screen on cotton material.

CO3 Identify dyes in powder form and in dyed materials.

CO4 Apply stiffening and softening finish on cotton

CO5 Analyse the shade using computer colour matching

HTPC216 : TEXTILE TESTING LAB – I

	L	T	P	C
COURSE OBJECTIVES	0	0	3	1.5

To enable the students to learn about

1 Moisture in substrate /textile material and its measurement.

2 Determination of fibre length, fineness, maturity and trash properties

3 Determination of yarn count and twist.

4 Testing yarn evenness, imperfections and classification of yarn faults

5 Determination of tensile strength of yarn

List of Experiments

1 Determination of Moisture Regain and Moisture Content of the given material by drying and weighing method.

2 Determination of Atmospheric Conditions in the Testing Lab (Relative Humidity and Temperature) by Wet and Dry Bulb Hygrometer.

3 Determination of effective length, mean length, dispersion percentage and short fibre percentage for the given cotton sample using Baer Sorter

4 Determination of fineness of given cotton sample by Airflow method

5 Determination of maturity value of given cotton sample

6 Determination of yarn count by Length and Weight method.

7 Determination of yarn count by Knowles Balance

8 Determination of yarn count from the given fabric swatch by using Beasley's Balance

9 Determination of yarn count by Quadrant Balance

10 Determination of twist per inch in the given sample of yarn using twist contraction method (Untwist – Twist)
11 Determination of twist per inch in the given sample of yarn using Straightened Fibre Method.
12 Visual assessment of yarn evenness using ASTM Black Boards
13 Determination of single yarn and lea strength of yarn

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1 Determine moisture content in fibre and humidity.
CO2 Assess fibre length, fineness and maturity
CO3 Determine yarn count and twist.
CO4 Analyse yarn evenness, imperfections and classify of yarn faults

-

SEMESTER V

HTPC301 : WEAVING TECHNOLOGY – II

COURSE OBJECTIVES	L	T	P	C
	3	0	0	3

To facilitate the students to learn about the
1 Working mechanism of various jacquard looms and harness building.
2 Working principle of projectile and rapier looms.
3 Different jet loom and its working mechanisms.
4 Fabric parameters such as warp, weft and cloth cover factor, warp and weft yarn weight in linear meter and related calculations

Unit 1 JACQUARDS   9
Functions of Jacquard - Types of Jacquard - Jacquard mechanism - Figuring capacities of Jacquards - Types of sheds in Jacquard Shedding - SLSC Jacquard - DLSC Jacquard - DLDC Jacquard - Open shed Jacquards - Harness building - Harness Ties - Casting out - Card cutting - Card Lacing - High speed Jacquard – Introduction to electronic Jacquard - Special Jacquard mechanisms.

Unit 2 SHUTTLELESS WEAVING MACHINES   9
Techno economics of Shuttleless loom weft insertion systems; Importance of Shuttleless weaving, Installation of Shuttleless weaving machine - Minimum down time Supply Package - Accumulator - Measuring system - Cutters and automation in Shuttleless loom, selvedge in Shuttleless loom, Quick style change. Projectile looms - Basics - Weft insertion - Picking mechanism - Beat up mechanism - Rapier Loom - Classifications of Rapier weaving machines - Driving systems - Rapier Heads.

Unit 3   JET LOOMS   9

Air Jet loom - Weft Insertion - Basic requirements - Merit and demerit - Water Jet loom - weft Insertion - Basic requirements - Merit and demerit - Multiphase looms - Various methods - Circular weaving. Loom monitoring and control Loom stoppages and efficiency; fabric defects and value loss; Filament weaving – Silk & Texturised yarns.

Unit 4   YARN AND FABRIC CALCULATIONS   9

Pierce's formula for estimation of diameter of yarns; relative diameter of yarns; calculation of cloth cover – warp cover, weft cover and cloth cover, derivation and calculations, fractional cover, percentage cover and cover factor.

Unit 5   FABRIC CALCULATIONS   9

Determination of Ends per inch and Picks per inch while changing count, weave and both to maintain the same level compactness. Determination of count of Warp & Weft and Ends per inch and Picks per inch while increasing or decreasing the weight of fabric to maintain same level of compactness, Cloth calculation - Amount of Warp and Weft weight per linear meter, weight per square meter using Direct, Indirect and Universal systems of yarn count.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Discuss the features of jacquard loom and its types.

CO2   Explain the function of each element in projectile and rapier weaving machine.

CO3   Summarise the working principle and weft insertion cycle of jet looms.

CO4   Estimate the yarn diameter and cover factor of fabric sample.

CO5   Analyse the fabric in-terms of warp and weft threads per unit length, weight per unit area and related calculations

TEXT BOOK

1   Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989.

2   Sabit Adanur, "Handbook of Weaving", Technomic Publishing Co. Inc., 2001

3   Ormerod A. and Sondhelm W.S., "Weaving: Technology and operations", Textile Institute, 1995.

REFERENCE BOOK

1   Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., "Weaving: Machines, Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998

2   "Weaving: The knowledge in Technology", Papers Presented at the Textile Institute WeavingConference, Textile Institute, 1998.

3   Booth J.E., "Textile Mathematics Volume 3", The Textile Institute, Manchester, 1977.

4   Lord P.R. and Mohamed M.H., "Weaving: Conversion of Yarn to Fabric", Merrow, 1992.

HTPC212 TEXTILE TESTING – II

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to learn about

1	Construction characteristics of fabrics
2	Determination of tensile, tear and bursting strength of fabric
3	The principle and measurement of comfort and surface characteristics of fabric
4	The standards and assessment procedure for fastness testing
5	Fabric inspection and quality assessment of garments

Unit 1   CONSTRUCTION CHARECTERISTICS   9

Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, determination of the type of weave, measurement of length, width, thickness and Area density (GSM);warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor calculations; Fabric sampling techniques.

Unit 2   FABRIC STRENGTH RELATED PROPERTIES   9

Tensile strength measurement – ravelled strip test and grab test – mechanical and electronic measuring systems. Tear strength – importance – measuring systems. Bursting strength and its measurement. Ballistic impact strength. Universal tensile tester - principle and operation

Unit 3   COMFORT AND SURFACE CHARACTERISTICS   9

Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drape coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

Unit 4   FASTNESS PROPERTIES OF TEXTILES   9

Objectives of various fastness testing of textile materials. Various standards and procedure to assess washing fastness, rubbing fastness, light fastness and perspiration fastness property of a textile material.

Unit 5   FABRIC INSPECTION AND GARMENT QUALITY   9
          EVALUATION

Fabric inspection – Manual, semi-automatic and Automatic Inspection systems, and classification of fabric defects, Method of Grading– 4 point system and 10 point system. Acceptable quality level (AQL), MIL standards and final inspection. Quality assessment of Garments - cutting, sewing, pressing, finishing and packaging defects.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Explain various constructional characteristics of a fabric
CO2 Determine fabric tensile characteristics of a fabric
CO3 Assess the comfort and surface characteristics of fabric
CO4 Explain the fastness characteristics of a textile material
CO5 Explain the fabric inspection and garment quality evaluation methods

TEXT BOOK

1 Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2 Saville B.P., "Physical Testing of Textiles", Textile Institute, Manchester, 1998
3 Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
4 Amutha, K. , A Practical Guide to Textile Testing, CRC Press, (2016).

REFERENCE BOOK

1 Dolez, P. I., Vermeersch, O., & Izquierdo, V. (Eds.),Advanced characterization and testing of textiles. Woodhead Publishing, (2017).
Ruth Clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000
2 Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998
3 Sara J. Kadolph., "Quality Assurance for Textiles and Apparels", Fair child Publications, New York,1998
4 Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993
5 Textile testing web course content https://nptel.ac.in/courses/116/102/116102029/#

HTPC 304 : JACQUARD WEAVING AND COMPUTER AIDED TEXTILE DESIGNING LAB

	L	T	P	C
COURSE OBJECTIVES	2	1	0	3

To impart knowledge to students on

1 Development of graph for simple and compound fabric structures and designs
2 Computer Aided Textile designing using different software
3 Card Punching procedure for Jacquards

List of Experiments

1 Design development on graph paper and card punching procedures for production of figured single cloth.
2 Design development on graph paper and card punching procedures for production of damask fabrics.
3 Design development on graph paper and card punching procedures for production of figured double cloth with 2 colour and 4 colour effects.
4 Design development on graph paper and card punching procedures for production of

figured warp/weft backed cloth.

5   Design development on graph paper and card - punching procedures for production of figured extra warp and extra weft fabrics.

6   Design development on graph paper and card and punching procedures for production of figured terry structures.

7   Study of figured pique structures, graph design development and card cutting procedures for these structures.

8   Study of patent satin structures, graph design development and card punching procedures for these structures.

9   Study of tapestry structures, graph design development and card cutting procedures for these structures.

10   Creation of design using paint shop pro /Adobe Photoshop /Corel draw

11   Conversation of vector image into Raster image.

12   Creation of dobby designs using CATD software.

13   Creation of Jacquard designs using CATD software.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Develop graphical design for simple and compound fabrics

CO2   Develop Textile designs by using designing software

CO3   Modify vector image to raster image using designing software

CO4   Create dobby and jacquard designs by using CATD software

-

HTPC 305 : TEXTILE TESTIN LAB - II

	L	T	P	C
COURSE OBJECTIVES	0	0	3	1.5

To enable the students to learn about

1   The Determination of crimp, shrinkage and GSM of fabric

2   The Determination of fastness properties of dyed textile materials

3   Determination of tensile, ballistic and bursting strength of fabric

4   Determination of crease recovery, stiffness and drape characteristics of fabric

5   Determination of pilling and abrasion resistance characteristics of fabric

List of Experiments

1   Determination of warp and weft yarn Crimp in the given fabric swatch.

2   Determination of shrinkage in the given fabric swatch

3   Determination of thickness and weight of given fabric sample in terms of weight / square yard and GSM.

4   Determination of Washing fastness of dyed material by following ISO and AATCC standards

5   Determination of Wet & Dry Rubbing fastness of dyed material using Crock meter.

6   Determination of Light fastness of dyed material

7   Determination of Ballistic Strength of the given fabric

8	Determination of Tensile Strength of the given fabric
9	Determination of Fabric Tearing Strength using Elmendorf Tear Tester
10	Determination of Crease recovery of the given fabric
11	Determination of Bursting strength testing of the given fabric
12	Assessment of Pilling characteristics of the given fabric
13	Determination of bending length of the given fabric using Shirley Stiffness Tester and Assessment of Drapeability of the given fabric
14	Assessment of Abrasion resistance of fabrics using Martindale Abrasion Tester

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Determine the crimp, shrinkage and GSM of the fabric
CO2   Assess the quality of fabrics in terms of fastness properties
CO3   Analyse tensile, ballistic and bursting strength of fabric
CO4   Determine crease recovery, stiffness and drape characteristics of fabric
CO5   Analyse pilling and abrasion resistance characteristics of fabric

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HS302 ENTREPRENEURSHIP AND START-UPS

	L	T	P	C
COURSE OBJECTIVES	3	1	0	4

1   Acquiring Entrepreneurial spirit and resourcefulness.
2   Familiarization with various uses of human resource for earning dignified means of living.
3   Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation.
4   Acquiring entrepreneurial quality, competency, and motivation.
5   Learning the process and skills of creation and management of entrepreneurial venture.

Unit 1   INTRODUCTION   TO   ENTREPRENEURSHIP   AND
        START – UPS
- Definitions, Traits of an entrepreneur, Intrapreneurship, Motivation
- Types of Business Structures, Similarities/differences between entrepreneurs and managers
  Government Schemes for Textile Entrepreneurs
- Handloom Promotion programs, schemes available MSME, NABCONS, Textile Clusters successful entrepreneur and expos, producer companies, GEM on boarding, craft village and Design Resource Centres

Unit 2   BUSINESS IDEAS AND THEIR IMPLEMENTATION
- Discovering ideas and visualizing the business
- Activity map

- Business Plan

Unit 3   IDEA TO START-UP
- Market Analysis – Identifying the target market,
- Competition evaluation and Strategy Development,
- Marketing and accounting,
- Risk analysis

Unit 4   MANAGEMENT
- Company's Organization Structure,
- Recruitment and management of talent.
- Financial organization and management

Unit 5   FINANCING AND PROTECTION OF IDEAS
- Financing methods available for start-ups in India
- Communication of Ideas to potential investors – Investor Pitch
- Patenting and Licenses

Unit 6
Exit strategies for entrepreneurs, bankruptcy, and succession and harvesting strategy

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1	Explain the dynamic role of entrepreneurship and small business
CO2	Discuss the role of Government schemes for entrepreneurship
CO3	Financial Planning and Control
CO4	Forms of Ownership for Small Business
CO5	Strategic Marketing Planning
CO6	New Product or Service Development
CO7	Business Plan Creation

REFERENCE BOOK
1   Steve Blank and Bob Dorf, The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company, K & S Ranch ISBN – 978-0984999392
2   Eric Ries, The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses, Penguin UK ISBN – 978-0670921607
3   Adrian J. Slywotzky with Karl Weber, Demand: Creating What People Love Before They Know They Want It, Headline Book Publishing ISBN – 978-0755388974
4   Clayton M. Christensen, The Innovator's Dilemma: The Revolutionary Book That Will Change the Way You Do Business, Harvard business ISBN: 978-142219602
5   https://www.fundable.com/learn/resources/guides/startup
6   https://corporatefinanceinstitute.com/resources/knowledge/finance/corporatestructure/
7   https://www.finder.com/small-business-finance-tips
8   https://www.profitbooks.net/funding-options-to-raise-startup-capital-for-your-business/

HTPC306 : FABRIC ANALYSIS AND COSTING LAB -II

	L	T	P	C
	2	1	0	3

COURSE OBJECTIVES

To enable the students to learn about

1. Analysis of cloth particulars and weave
2. Factors involved in fabric costing

List of Experiments

1. Analysis of weave, constructional details, weaving techniques and costing of at least two traditional handloom sarees
2. Extracting the production particulars of given plain fabric sample and furnishing the production and cost details.
3. Extracting the production particulars of given handloom multi treadle design fabric sample and furnishing the production and cost detail
4. Extracting the production particulars of given handloom extra warp and weft sample and furnishing the production and cost detail
5. Extracting the production particulars of given double cloth sample and furnishing the production and cost detail
6. Extracting the production particulars of given handloom jacquard design fabrics and furnishing the production and cost detail

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Analyse and extract the construction particulars of woven fabric sample for reproduction

CO2   Estimate the cost of fabric.

HTPC307: HANDICRAFT TEXTILES & HANDLOOM TOURISM OF INDIA

	L	T	P	C
	3	0	0	3

To be framed.

HTPE201 : TEXTILE COSTING

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable to learn about

1 Elements of cost accounting
2 Costing of yarns and fabrics in spinning and weaving mills
3 Wet process cost
4 Costing of apparels in a garment unit
5 Working capital management

Unit 1   ELEMENTS OF COST ACCOUNTING   9

Introduction to cost accounting, - Cost ledgers: Reconciliation between cost and financial accounting, Costing methods, Product Costing, Job, order, Batch, Contract costing and Cost Sheet.
Elements of cost & classification of cost elements – examples from spinning and weaving mill; standard costing, analysis of variance; breakeven analysis, cost volume profit analysis

Unit 2   YARN AND WET PROCESS COST   9

Costing of yarn – material, labor, power and overhead expenses; allocation of costs to yarns in spinning mill running with different counts- balancing of machinery.

Unit 3   FABRIC COSTING   9

Woven Fabric costing: Yarn cost, warp weight, Weft weight, preparation charge cost, Sizing cost, Warping cost, weaving cost, other cost, miscellanies cost, profit & cost sheet.
Knitting Fabric Costing: Yarn cost, knitting cost, post knitting charge, miscellanies cost, profit & cost sheet.

Unit 4   GARMENT COSTING   9

Fabric and accessories Cost Estimation at Garment Factory for cutting, stitching, checking, packing, forwarding, shipping, insurance etc.

Unit 5   WORKING CAPITAL MANAGEMENT   9

Project cost- Working capital management in spinning, weaving and chemical processing unit – determination, sources, cost; Budget, types of budgets, budgeting and control in textile unit.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Summarize broadly about Costing, accounting elements of cost in textile industries
CO2   Compare the process costs for yarn &and wet processing of textiles
CO3   Estimate the cost of Woven and knitted fabrics
CO4   Decide the cost of various garment products

CO5   Justify the concept of working capital management and execute financial planning of various textile sectors and profitability to achieve the organization goal.

TEXT BOOK

1. Johnson Maurice, E. Moore, "Apparel Product Development", Om Book Service, 2001.
2. Katherin McKelvy, "Fashion Source Book", Om Book Service, 2001.
3. M. Krishna Kumar, Apparel Costing, Publisher: Abhishek Publications, 2015
4. Hardman Arthur H, Productive Costs in Cotton Spinning Mills, Publisher: Nabu Press, October 2010.
5. Principles of Cost Accounting: Managerial Applications by Richard D Irwin Management Accounting, Sultan Chand and Sons.

REFERENCE BOOK

1. M.N.Arora, Cost Accounting: Principles and practice, New Delhi: Vikas publishing Pvt. Ltd., 2011.
2. Horngreen, Foster &Datar,Cost Accounting-A Managerial Emphasis, New Delhi: Prentice Hall India, 2010.
3. Dr. Ashish K. Bhattacharyya, Principles and Pracitice of Cost Accounting, NewDelhi: Prentice Hall (PHI), 201
4. I.M.Pandey,Financial Management, New Delhi: Vikas Publishing House Pvt. Ltd.,2012
5. Brigham and Houston, Fundamentals of Financial Management, New Delhi: Thomson Learning,
6. Prasanna Chandra, Financial Management-Theory and Practice, New Delhi: Tata McGraw- Hill Publishing Company Ltd, 2012
7. Aswat Damodaran., "Corporate Finance Theory and Practice", John Wiley & Sons, 2001,
8. James C., Van Home., "Financial Management and Policy", 12th Edition Prentice Hall of India Pvt. Ltd., New Delhi, 2001
9. Thukaram Rao M.E., "Cost and Management Accounting" New Age International, Bangalore, 2004.
10. Khan., and Jain, "Basic financial Management & Practice", 7th Edition, Tata McGraw Hill, New Delhi, 2014.

HTPE 202 : GARMENT MANUFACTURING TECHNOLOGY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To impart knowledge to students on

1. Basics of garment making process like spreading
2. Garment components

Unit 1   INTRODUCTION AND CLASSIFICATION   9

Introduction to Apparel Industry: Apparel industry in India - Domestic industry: Various

departments in the Garment industry; Classification of garments; Type of fabric – season – events – application – manufacturing – sources – gender and age – style and shape – length of the garment. Process flow chart for the production of basic garments.

Unit 2   MEASUREMENTS AND PATTERN MAKING   9

Anthropometry – 8 head theory - The sequence of taking body measurements. Concepts of basic pattern making - types of pattern making - principles for pattern drafting with examples – pattern making tools and its applications - concepts of pattern grading.

Unit 3   SPREADING AND CUTTING   9

Introduction to fabric spreading, marker planning and marker efficiency. Types and functions of cutting machines – straight knife, round knife and band knife cutting machines. Introduction to computerised cutting machines. Common defects in spreading, cutting and their remedies.

Unit 4   SEAMS, STITCHES, ACCESSORIES AND TRIMS   9

Types of Stitches and Federal classifications - Types of seams and Federal classifications. Defects in stitches and seams. Basic parts of sewing machines and their functions. Sewing thread – construction, material, thread size and packages. Introduction to Trims and accessories – Labels, linings, interlinings, waddings, lace, braids, elastics, shoulder pads, Fastener - hook and loop (Velcro), Hook and eye, button and Zip

Unit 5   SEWING MACHINES   9

Basic parts of sewing machines and their functions. Classification of the sewing machine and its applications: Single Needle Lock Stitch Machines (SNLS), Double Needle Lock Stitch Machines (DNLS), Overlock and Flatlock. Sewing machine bed types and their applications. Introduction to Sewing Needles, its types, size and their application. Introduction to different special-purpose sewing machines: Feed of arm, button hole sewing, button sewing, Bartack, blind stitch machines and embroidery sewing machines. Fusing and Pressing.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

    CO1   Explain domestic apparel industry and classification of garments.
    CO2   Apply standard measurements for garments and concepts of pattern making.
    CO3   Discuss about spreading, marker planning and cutting operations in garment industry
    CO4   Describe different types of seams, stitches, Trims and accessories used in garment construction
    CO5   Identify various sewing machines used for different processes of garment manufacturing

TEXT BOOK

    1   T P Karthik, T Ganesan & D Gopala Krishnan, AMT, CRC press.
    2   Jacob Solinger, Apparel Manufacturing Handbook, Van Nostrand Reinhold

Company, 1980

3 Harold Carr& Barbara latham, The Technology of Clothing Manufacture, Black well Sciences, 1996

REFERENCE BOOK

1 Ruth E. Glock & Grace I. Kunz, Apparel Manufacturing Sewn Product Analysis, Pearson Prentice Hall, 2005

2 Shaeffer Claire, "Sewing for the Apparel Industry", Prentice-Hall, New Jersey, 2001

3 Mary Mathews, " Practical Clothing Construction" Part I & II, Cosmic Press, Madras

4 Gerry Cooklin, Garment Technology for Fashion Designers, Blackwell Science Ltd, 2001

5 Zarapkar, System of Cutting, Bombay publications, 2006

HTPE203: NONWOVEN TECHNOLOGY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to learn about the

- Concepts of nonwovens, fibre preparation and characteristics
- Different techniques involved in web formation
- Various web bonding processes
- Polymer-extrusion based technologies for nonwovens manufacture
- Testing of nonwoven fabrics and applications

Unit 1   FUNDAMENTALSOF NONWOVEN FABRICS   9

Introduction to nonwovens – Definitions and classification of nonwovens-fibre preparations and their characteristics for the production of nonwovens and Applications of nonwovens methods of nonwoven fabric production.

Unit 2   WEB FORMATIONWITHSTAPLEFIBRES   9

Production of staple fiber web: Dry laid – card, air; wet laid; web layering techniques – parallel, cross and perpendicular. Influence of web laying methods on fabric properties; quality control of web.

Unit 3   MECHANICAL,CHEMICALAND THERMAL   9
          BONDING

Web Bonding Processes: mechanical bonding-needling, stitching, water jet consolidation; Thermal Bonding technologies; Chemical bonding–Binder polymers and bonding technologies

Unit 4   POLYMER– LAID WE BAND FABRIC FORMATION   9

Polymer-extrusion based technologies - Manufacture of Spun bonded fabrics; Manufacture of Melt blown fabrics – fibre formation and its attenuation; Effect of processing parameters on fabric characteristics

Unit 5   FINISHING AND TESTING OF NONWOVENS   9

Introduction – Mechanical and chemical finishing of nonwoven; Testing – standards for nonwovens; Stages of testing – fibre preparation and nonwovens stages; testing based on applications

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Classify nonwovens and explain the basics of fibre preparation and fabric manufacturing methods for nonwovens

CO2 Describe different web forming techniques for nonwovens manufacturing

CO3 Summarize and compare different bonding methods used in nonwovens manufacturing

CO4 Explain polymer laid web formation techniques and manufacture of spun bonded and melt blown fabrics

CO5 Evaluate the performance of nonwovens from fibre preparation to nonwoven manufacturing stages with different standards.

TEXT BOOK

1 Lunenschloss J., Albrecht W.and David Sharp., "Nonwoven Bonded Fabrics", Ellis Horwood Ltd., New York,1985.

2 Nonwovens: Process, structure, properties and applications, by T.Karthik, R.Rathinamoorthy, C. Praba Karan, Woodhead Publishing India Pvt Ltd. New Delhi.

3 Russell S.,"Hand Book of Nonwovens", Textile Institute, Manchester,2004.

4 Chapman R.,"Applications of Nonwovens in Technical Textiles", Textile Institute, Manchester,2010.

REFERENCE BOOK

1 Mrstina V. and FeigF., "Needle Punching Textile Technology", Elsevier, New York, 1990.

2 Dharmadhikary R. K., Gilmore T. F., Davis H. A. and Batra S. K., "Thermal Bonding of NonwovenFabrics", Textile Progress,Vol.26,No.2,Textile Institute Manchester, 1995.

3 JirsakO.and WadsworthL. C., "Nonwoven Textiles", Textile Institute, Manchester,1999.

4 NPTEL on Nonwoven Technology (https://nptel.ac.in/courses/116/102/116102014/)

5 O. Irsak, Nonwoven Textiles, Textile Institute, Manchester, 1999

HTPE301 : KNITTING TECHNOLOGY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

- To enable the students to know about fundamentals of weft and warp knitting and classifications of knitted fabrics

- To enable the students to know about the fabric structures and their derivatives
- To illustrate the students about the mechanism of loop formation in weft and warp knitting.

Unit 1 INTRODUCTION TO KNITTING   9

Introduction to knitting; Comparison of fabric properties - woven, knits and nonwoven fabrics; classification of knitting processes – weft knit & warp knit; yarn quality requirements for knitting. Preparation of staple yarns for weft and warp knitting. Basic terminologies such as course, wales, technical face, technical back, course length, stitch length, WPI, CPI, stitch density, GSM, Tightness Factor etc.,

Unit 2 FUNDAMENTALS OF KNITTING   9

Needles – types, merits and demerits, Loop forming sequence of latch, bearded & compound needles. Passage of material through weft knitting machines. Functional Elements: Sinkers, Cylinder, Dial, Cams, Creels, Feeder, Fabric Spreader, Take down and winding Mechanism. Elements of knitted loop structures.

Unit 3 WEFT KNIT STRUCTURES   9

Basic weft knitted structures, production and properties - plain, rib, interlock and purl; Line, Symbolic and diagrammatic notations of basic weft knitted structures, Factors affecting the formation of loop; effect of loop length and shape on fabric properties; Fundamentals of formation of knit, tuck and float stitches

Unit 4 FLAT KNITTING AND DERIVATIVES   9

Basic principles and elements of flat knitting machines; different types of flat knitting machines - manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines

Unit 5 WARP KNITTED STRUCTURES   9

Basic principles; elements of warp knitted loop – open loop, closed loop; warp knitting elements chain link, chain links for simple patterns, guide bar movement mechanism. Tricot and Rachel warp knitting machines. Let-off system; take-up system; Uses of warp knitted fabrics in technical applications

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Explain the basic knitting terminology, specifications and functions of weft knitting machines

CO2   Explain the sequence of loop formation, passage of material and role of functional elements of knitting

CO3   Identify different structures of the basic weft knitted structures

CO4   Explain the basic terminology in flat ~~warp~~ knitting, specifications and functions of flat knitting machines

CO5 Demonstrate the loop formation in warp knitting

TEXT BOOK
1. Anbumani N., Knitting-Fundamentals, Machines, Structures and Developments, New Age International Publishers, 2007.
2. Ray, S. C. (Ed.). Fundamentals and advances in knitting technology. CRC Press. 2012.

REFERENCE BOOK
1. Henry Johnson, Introduction to Knitting Technology, Abhishek Publications, Chandigarh, 2006.
2. Ajgaonkar D.B., Knitted Technology, Universal Publishing Corporation, Mumbai, 1998.
3. Spencer D.J., Knitting Technology: A Comprehensive Handbook, Woodhead Publishing Limited, England, 3rd Edition, 2001.
4. Maity, S., et. al., (Ed.). Advanced Knitting Technology, Woodhead Publishing, UK. 2021

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HTPE302 : ADVANCED FABRIC STRUCTURE

COURSE OBJECTIVES	L	T	P	C
	3	0	0	3

To impart knowledge to student on
1. Graph preparation for Jacquard looms,
2. Card punching procedure for figured fabric
3. Types of harness building and construction of harness

Unit 1   JACQUARD CARD PUNCHING AND EXTRA WARP   9
AND WEFT DESIGNS

Study of the jacquard graph development and card punching technique for straight tie-straight draft, straight tie- sectional draft, sectional tie- sectional draft arrangements. Introduction of traditional loom mountings- heald and harness mountings, Pressure harness, Bannister harness, working comber boards in various designs. Damask – Salient features – Structure of cloth – Designing, enlargement and punching techniques for jacquards. Figured extra warp and extra weft designs using jacquard and jacquard with healds.

Unit 2   FIGURED PATENT SATIN AND PIQUES   9

Figured Patent satin – structure of cloth – Use of straight tie with healds- use of working comber for saving of punched cards-Designing, simplified enlargement and punching technique. Figured piques – Structure of cloth – Use of Straight tie with healds – use of working comber board in fast back structures to save punched cards-designing and Simplified enlargement technique.

Unit 3   FIGURED BACKED CLOTH   9

Figured warp backed cloth – Structure of cloth – Use of sectional harness in simplification

of graph development process and punching technique. Figured weft backed cloth – Structure of cloth – Separation of two series of weft for simplifying graph development process and punching technique. Tapestry – Traditional and modern Tapestries – Simple weft faced tapestries; two coloured weft faced reversible structures; three colour and four colour weft faced reversible and non-reversible structures. Modern Tapestry–3 pick & 4 picks tapestry using jacquard and heald method. Designing, simplified enlargement and punching techniques

Unit 4   FIGURED DOUBLE CLOTH AND TERRY   9
Study on Figured double cloth and Figured Terry (3 and 4 pick terry weave) –Design development and punching process for straight harnessing with straight draft , straight harnessing with sectional draft ,sectional harnessing with sectional draft – Structure of cloth.

Unit 5   GAUZE AND FIGURED LENO   9
Figured Leno and gauze fabrics – Salient features-Bottom douping and top douping. Stripe and Check effect; plain, twill and leno combination; Cord effect, Net leno. Indication of leno structures, drafting plan and lifting plan of straight and pointed draft structures. Chenille Axminister pile fabrics manufactured using handlooms - technique of fabric manufacture and designing

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Develop the figured single cloth design and understand the working of traditional handloom mountings.
CO2   Construct weave, draft, peg-plan for the production of figured Patent satin and piques
CO3   Describe Figured warp backed cloth, figured weft backed cloth and Tapestry fabrics
CO4   Develop the figured double cloth and Terry fabric
CO5   Construct gauze and figured Leno fabrics

TEXT BOOK
1   Grosicki Z. J., "Watson's Textile Design and Colour", Vol.1, Woodhead Publications, Cambridge England, 2004
2   Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989..
3   Grammar of Textile Design by H. NISBET, F.T.I.

REFERENCE BOOK
1   Geormar D. Woven Structure and Design Part I Single Cloth Construction WIRA UK 1986
2   Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA,U.K., 1989.
3   X. Chen,M. Spola,J. Gisbert Paya &P. Mollst Sellabona1,Experimental Studies on

the Structure and Mechanical Properties of Multi-layer and Angle-interlock Woven Structures, Pages 91-99

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HTPE 303 : FASHION DESIGNING

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

1. To enable the students know about the basics of fashion terms, fashion cycle and fashion designing
2. To elaborate the students about the colour theory and principles of design.
3. To teach the students about the design and portfolio development.

Unit 1   9

Definition and origin - terms & definitions - reasons for change in fashion - classification of fashion – Style, classic, FAD, Trend - fashion cycle. Fashion designing - designers" role in styling and production of costumes.

Unit 2   9

Design aesthetics – Definition, Types - Structural and decorative design. Elements of design – line, shape, form, colour & texture. Lines – varieties and their application in a design. Shapes - Types – Natural, stylized, geometrical, and abstract.
Colour – Definition and origin – Characteristics (hue, value and intensity) - Prang colour chart - color harmony and colour schemes. Psychology of colour and its application in apparel market. Texture – types of texture and its application in clothing.

Unit 3   9

Balance, proportion, rhythm, harmony & emphasis. Balance - asymmetrical and symmetrical. Types – Formal, Informal and radial. Proportion or scale – planning the shapes and space.
Rhythm – through repetition, alternation, progression and gradation. Emphasis using contrast colours and background. Harmony of lines, shapes, colour and textures.

Unit 4   9

Skirts - Basic concepts in designing the variety of skirts. Trousers – Basic concepts in designing the variety of trousers. Introduction to neck lines, waistlines, hemlines, collars, sleeves, cuffs, plackets and pockets. Fullness applied in apparel –tucks, pleats, gathers, shirring, frills or ruffles, flounces.

Unit 5   9

Market research - method of fashion Trend forecast. Silhouettes – Types and their application in everyday use. Wardrobe planning –Portfolio development.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1 Explain basic fashion terminology, theories involved in fashion cycle and role of fashion designer.
CO2 Apply elements of design and color theories on clothings.
CO3 Explain various principles of design used in apparel.
CO4 Explain basic concepts in designing of various garments and its components.
CO5 Describe methods of trend forecast and develop design portfolio

TEXT BOOK
1 Parul Bhatnagar, "Traditional Indian Costumes and Textiles", Abhishek Publications, Chandigarh,2004.
2 Elaine Stone, "The Dynamics of Fashion", Fairchild Publications, New York, 2001.

REFERENCE BOOK
1 Peacock J., "Fashion Source Books", Thames and Hudson, 1997-98.
2 Gini Stephen Frings, "Fashion Concept to Consumer", Prentice Hall, New Jersey, 2004.

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HTPE304 : TECHNICAL TEXTILES

		L	T	P	C
COURSE OBJECTIVES		3	0	0	3

To enable the students to learn about
1 Classification of technical textiles, overview of properties of high performance fibres and applications of technical textiles
2 Requirements and manufacture of tyre cords
3 Properties and manufacture of belts and hoses
4 Textiles in filtration and protective garments
5 Various technological aspects of geo and medical textiles

Unit 1 INTRODUCTION TO TECHNICAL TEXTILES 9

Introduction: Definition – scope – milestones in the development, textile process, applications of technical textiles - twelve sectors of technical textiles - raw materials used in technical textiles;

High performance fibres: Glass, carbon, aramid and ultra high modulus fibres – properties, structure and applications.

Unit 2 TYRECORDS AND BELTS 9

Requirements of tyrecord - suitability of various fibres - polyester and nylon tyre cords – manufacture of tyrecords. Conveyor Belts - physical and mechanical properties-construction, manufacture of conveyor belts, requirements of Seat belt and air bags

Unit 3 TEXTILES IN FILTRATION 9

Filter fabrics: Introduction- principles of filtration - types of filtration, Textiles in liquid

filtration - Textiles in dry filtration – Dust collection theory – cleaning mechanism of filters

Unit 4   PROTECTIVE TEXTILES   9
Protective clothing: requirements of protective clothing.   Principle, Fiber and fabric requirements for Ballistic protection, Flame resistant protective clothing. Chemical protective textiles.

Unit 5   MEDICAL TEXTILES AND GEO TEXTILES   9
Medical Textiles: Introduction – Materials used in bio textiles - Classification - implantable, and non-implantable materials- sutures
Geo-textiles: Definition- functions - raw materials - woven, nonwoven and knitted Geo-textiles-Applications of geo-textiles for drainage, separation, soil reinforcement, and filtration and erosion control.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Define, classify technical textiles sectors and describe the properties and applications of high performance fibres used for technical textiles
CO2   Elucidate requirements, manufacture and properties of tyre-cord fabrics and belts
CO3   Explain the filtration mechanism and different types of filters
CO4   Illustrate the materials and properties of different protective textiles
CO5   Implement the role of textile materials in geo textiles and medical textiles product development.

TEXT BOOK
1   Handbook of Technical Textiles, Ed. A R Horrocks and S C Anand, Woodhead Publication Ltd., Cambridge (2000)
2   Handbook of technical textiles, Volume 1: Technical Textile Processes by A Richard Horrocks, Subhash C. Anand, The Textile Institute, WoodheadPublication Ltd., Cambridge (2016).
3   Handbook of technical textiles, Volume 2: Technical Textile Applications by A Richard Horrocks, Subhash C. Anand, The Textile Institute, Wood head Publication Ltd., Cambridge (2016).
4   AdanurS., "Handbook of Industrial Textiles", Technomic Publication, Lancaster, 2001

REFERENCE BOOK
1   Kanna M.C.,Hearle, O Hear., Design and manufacture of Textile Composites, Textile progress, Textile Institute, Manchester, April 2004.
2   Scott, Textile for production, Textile progress, Textile Institute, Manchester, Oct. 2005.
3   Shishoo,Textileinspot,Textileprogress,TextileInstitute,Manchester,Aug.2005
4   Kennady, Anand Miraftab, Rajandran, Medical Textile & Biomaterials for Health care,WoodheadpublishingLtd.,UK,2005

5   Medical Textiles-International Conference on Medical Textiles, Bolton, Woodhead Publication,Cambridge,1997 Geo textile by John, N.W.M, Blackie publication, Glasgow, 1987

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HTPE305 : APPAREL MARKETING AND MERCHANDISING

	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

1   To enable the students to learn about the marketing strategies and functions in apparel merchandising.
2   To explain the students about sourcing strategies, supply chain management and time management.
3   To elaborate the students about various documents meant for apparel exports.

Unit 1   MARKETING   9

Apparel marketing: Definition, scope, functions and strategies of marketing.

Market Research: International market, retail and wholesale market and domestic market.

Advertising: Purpose, methods, types of advertising media, sales promotion methods.

Unit 2   MERCHANDISING   9

Apparel Merchandising: Definition, functions of merchandising division, roles and Responsibilities of merchandiser.

Types of Merchandising: Principles and techniques of apparel merchandising, retail merchandising, visual merchandising, interfacing merchandising with production.

Unit 3   SOURCING   9

Sourcing: Definition, need and important factors in sourcing, methods of sourcing raw materials, sourcing of accessories, manufacturing resource planning, principles of MRP, Overseas sourcing - sourcing strategies. Supply chain and demand chain analysis, Materials management for quick response, Buying houses.

Unit 4   DOCUMENTATION   9

Order confirmation, various types of export documents, pre-shipment post-shipment documentation -terms of sale - payment - shipment

Unit 5   TIME MANAGEMENT   9

Time management in merchandising, production scheduling, route card format, accessories follow-up, practical check points, computer applications in marketing and merchandising.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1 Explain various types of apparel market and advertising techniques involved in merchandising.
CO2 Discuss the types and functions of merchandising.
CO3 Explain the factors involved in sourcing, supply chain and material management systems.
CO4 Classify various types of documents used for export of apparels.
CO5 Develop production scheduling and manage time in marketing and merchandising

TEXT BOOK
1 V. R. Sampath, P. Perumalraj and M. Vijayan, "Apparel Marketing and Merchandising",Kalaiselvam Pathipppakam, Coimbatore, 2007.
2 Vijay Barotia, "Marketing Management", Mangal Deep Publication, New Delhi, 2001.

REFERENCE BOOK
1 Moore Evelyn C., "Path for Merchandising- A Step by Step Approach", Thames and Hudson Ltd., London, 2001.
2 Jarnow J. and Dickerson K. G., "Inside the Fashion Business", Prentice Hall, New Delhi, 1997
3 Laine Stone and Jean Samples, "Fashion Merchandising", McGraw Hill Books, Singapore, 1985
4 Ruth E Glock, Grace I Kunz, "Apparel Manufacturing", Sewn Product Analysis - 3rd Edition,Prentice Hall Inc., 2000
5 J. A. Jarnow, M. Guerreiro and B. Judelle, "Inside the Fashion Business", Macmillan PublishingCompany, 1990.
6 Grace I. Kunz, "Merchandising: Theory, Principles and Practice", Fairchild Books, 2005
7 Elaine Stone and A. Jean, "Fashion Merchandising - An Introduction", McGraw-Hill BookCompany, 1990.

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HTPE306 : ADVANCES IN TEXTILE PROCESSING

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to understand
1 The concept of biotechnology in textile processing,
2 The process of combined, continuous and blend processing.
3 Special prints and concept of digital printing
4 The advancement in finishing and garment processing
5 The concept of eco-friendly processing and effluent treatment.

Unit 1   BIO-TECHNOLOGY IN TEXTILE PROCESSING   9
Introduction – Enzymes-mechanism of enzyme action, Process conditions for activating enzymes and Factors affecting efficiency of enzyme treatment. Pretreatments –

Enzymatic desizing, enzymatic degumming, enzyme scouring, enzymatic bleaching. Finishing − Bio-finishing and Use of enzymes in Denim washing .Merits and Demerits of enzyme processing.

Unit 2   COMBINED, CONTINUOUS AND BLENDS   9
          PROCESSING
Introduction, combined scouring and desizing, combined scouring and bleaching, combined desizing, scouring and bleaching. Continuous process – need, machines used. Pretreatment and dyeing of Polyester/Wool, Polyester/Cotton and Polyester/Viscose, cotton/spandex.

Unit 3   SPECIAL PRINTS AND DIGITAL PRINTING   9
Special Printing Effects – Brasso, Kadi, Metallic, high density print, crepon style, Flock printing and Foam printing.
Digital Printing – Introduction, principle, methods, pretreatment, ink types and substrate, advantages and disadvantages.

Unit 4   FINISHING AND GARMENT PROCESSING   9
Introduction, Definition, concept and applications of nanotechnology, plasma technology, micro-encapsulation, ultrasonic, UV protection, antimicrobial finishes.
Garment processing - Introduction, factors to be considered, machineries used, advantages and disadvantages.

Unit 5   ECO-FRIENDLY PROCESSING AND EFFULUENT   9
          TREATMENT
Pollution in textiles-Introduction, textile pollutants, banned dyes, harmful chemicals, alternatives to banned dyes and chemicals. Characteristics of waste water, Effluent treatment – methods, design and working of ETP and tolerance level of effluent.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
   CO1   Describe the application of enzyme in textile wet processing.
   CO2   Explain the combined processing and processing of blends.
   CO3   Appraise on various special prints and concept of digital printing.
   CO4   Discuss on advancement in textile finishing and garment processing.
   CO5   Explain the concept of eco-friendly processing and ETP.

TEXT BOOK
   1   Chemical technology in the pre-treatment processes of textiles – S.R.Karmakar, Elsever, 1999.
   2   Textile Printing – R.S.Prayag.

3   Digital Printing of Textiles, Ujiie. H. Woodhead publishing,2006.
4   Technology of Dyeing – V.A.Shenai
5   Garment Finishing & Care Labelling by S.S.Satsangi, Usha Publishers, 53-B/AC-IV, Shalimar Bagh, New Delhi.

REFERENCE BOOK
1   Handbook of Textile processing machinery – R.S. Bhagwat1999.
2   Eco-friendly wet processing, NCUTE.

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HTPE 307 : TECHNOLOGICAL DEVELOPMENTS IN HANDLOOMS

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To impart knowledge to students on
1   Developments in preparatory and handloom weaving processes
2   Working principles of various elements in handlooms.

Unit 1   DEVELOPMENTS IN HANDLOOM WEAVING   9
          PREPARATORY MACHINES

Objectives of Technological developments in handlooms- the layout of placing the looms in systematic / organized way and its merits and demerits – Limitations of Hand operated pirn, cheese and bobbin winding charkas used in preparatory processes. Advantages of single spindle and multi spindle winding machines over hand operated charkas.

Unit 2   DEVELOPMENTS IN STRUCTURE OF   9
          HANDLOOM

Importance of Angle iron pillars and cross bars used in place of wooden pillars and cross bars in pit looms - Power operated in-house beaming machine for long length of warp and its advantages- Improved Frame loom and its advantages.

Unit 3   DEVELOPMENTS IN TAKE UP AND   9
          HANDLOOM DOBBIES

5 wheel take up motion and worm & worm wheel take up motions used in handlooms - Drop box or vibrating box attachments on handlooms - Vertical Handloom dobby - Its merits and demerits. Plunger mechanism used in Durry weaving and its advantages

Unit 4   SOLID BORDER WEAVING AND TWIN CLOTH   9

Weaving on handlooms with multiple jacquards - Solid border weaving with catch cord technique – Solid border weaving sley - Multiple butta weaving sley - Advantages and disadvantages of these mechanisms. Twin cloth weaving sley. Improved pit loom.

Unit 5   SEMI AUTOMATIC HANDLOOM AND ITS   9
          ATTACHMENTS

Semi-automatic looms – Nepali pedal loom, Chittaranjan loom, banaras semi-automatic loom, itchalkaranchi loom – Electric motor operated jacquard lifting mechanism, Pneumatic lifting mechanism for jacquard. Electromagnetic lifting mechanism for heald

shaft – Merits and demerits of these mechanisms.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Express various advanced preparatory processes in handloom weaving
CO2   Describe the various developments in structure of handloom
CO3   Explain various developments in take-up mechanisms and handloom dobbies
CO4   Express the solid border weaving and twin cloth
CO5   Demonstrate various handlooms and its advanced mechanisms

REFERENCE BOOK
1   Mamidipudi, Annapurna & Bijker, Wiebe. (2018). Innovation in Indian Handloom Weaving. Technology and Culture. 59. 509-545. 10.1353/tech.2018.0058.
2   http://textilescommittee.nic.in/sites/default/files/coursecontent/Dobby%20Handloom%20Weaver.pdf
3   http://textilescommittee.nic.in/sites/default/files/course-content/Dobby%20Handloom%20Weaver.pdf
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HTPE308 : TRADITIONAL HANDLOOM TEXTILES OF INDIA

	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To impart knowledge to students on
1   Product specifications and production techniques of traditional handloom products
2   Organisations and Government Acts related to handlooms

Unit 1   9

Product specifications, production techniques, raw material and unique characteristics of Banaras Brocade Silk Saree, Baluchari Silk Saree, Bomkai Saree, Chanderi Saree, Chettinad Cotton Saree, Gadwal Saree, Ilkal Saree, Jamdani Cotton Saree.

Unit 2   9

Product specifications, production techniques, raw material and unique characteristics of Kota Doria Saree, Khandua Saree, Kani Pashmina Shawl, Kancheepuram Silk Saree, Maheswari Saree, Mangalgiri Saree, Paithani Saree, Pochhampally Ikat Saree, Siddipet Gollabama Saree,

Unit 3   9

Product specifications, production techniques, raw material and unique characteristics of Shantipuri Cotton Saree, Tangail Cotton Saree, Tanchoi Silk saree, Uppada Jamdani Silk Saree, Venkatgiri Cotton Saree, balaramapuram cotton saree

Unit 4   9

India Handloom Brand (IHB) - Objectives – benefits – standard operating procedure – Detailed procedure on surveillance – certificate of registered trade mark. Role of Office of DCH, Weaver's service centres and Textile Committee on IHB. Handloom mark –

Objectives, details of schemes, Silk mark – Objectives, details of scheme. Introduction to Global Organic Textile standard (GOTS)

Unit 5   9

The Handloom (Reservation of articles for Production) Act, 1985; Terms and definitions. Range reserved for exclusive production by handlooms. Power to specify articles for exclusive production by handlooms. Constitution of advisory committee. Prohibition of production of articles reserved exclusive production by handlooms- power to call information, inspection, search and seize – penalty for contravention

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Describe the specifications and production techniques of traditional sarees
CO2   Explain the specifications and production techniques of shawls and sarees
CO3   Describe the unique characteristics of traditional sarees
CO4   Explain the importance of handloom certification process
CO5   Describe the Handloom reservation act and its importance

REFERENCE BOOK

1   https://www.indiahandloombrand.gov.in/
2   http://cbseacademic.nic.in/web_material/Curriculum/Vocational/2015/Traditional_India_Textile_and_Basic_Pattern_Dev_XII/CBSE_Traditional_Indian_Textiles%20_XII.pdf
3   The Handloom (Reservation of articles for Production) Act, 1985, no 22 of 1985.
4   John Gillow, Nicholas Barnard, "Traditional Indian Textiles"
5   Anjali karolia, **"Traditional Indian Handcrafted Textiles"** History, Techniques, Processes, and Designs Vol. I & II

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HTPE309 : HOME TEXTILES

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To enable the students to learn about

1   Fundamentals of home textile, materials used for home textile products and factors affecting their selection of home textile.
2   Kitchen textiles, draperies, bed linen and towels.
3   Manufacture and properties of floor coverings.
4   Care of home textiles and testing of home textile products.

Unit 1   FUNDEMENTALS OF HOME TEXTILES   9

Home Textiles: Definition, different types of home textiles, selection of fibers, Colors, Designs, factors affecting selection of home textiles, woven & Nonwoven; Upholstery: Materials - Fixed upholstery, Non-stretch loose covers, Stretch covers - Cushion covers; Table Textiles - Definitions, Different types, table mats, table cloth and hand towels, selection of material, use and care labeling; Living Room Furnishing - Sofa covers, wall

hangers, cushion, cushion covers, upholsteries, bolster and bolster covers

Unit 2 KITCHEN TEXTILES AND DRAPERIES   9

Kitchen Textiles: Definition, Types- apron-dish cloth, bread bag, pot holders, hand towels, fridge cover, fridge handle covers, mixer cover, grinder covers their use and care labeling; Wall coverings- use and care labeling; Draperies and curtains- choices of fabrics, calculating the amount of material needed, hints on making curtains, hang wall; Methods of furnishing draperies at the top with tucks or pleats; Use of drapery rods, hooks, tapes, rings and pins.

Unit 3 BED LINENS AND TOWELS   9

Bed Linen -Definitions, different types of bed linens, sheets, blankets, blanket vovers, comforters, comforter covers and bed spreads; Mattress - Mattress covers, pads, pillows; Made-ups in hospitals; Textiles care labeling; Towels: Types, bath robes, bead towels, napkins; Construction of towels- weave, pile height - pattern - dyeing and finishing, Absorption tests; Velour - Types of velvet and construction.

Unit 4 FLOOR COVERINGS   9

Floor covering: hard floor coverings, resilient floor coverings, soft floor coverings, Rugs, cushions pads and care labeling; Carpet Manufacture methods & Types: Tufted, Hand tufted, Needle felt, Woven & Knotted. Wilton & Administer - Knitted, Stitch bonding and & Flocking; Carpet fibers and &yarns: Wool, wool blend, nylon, polypropylene, polyester and & acrylic

Unit 5 CARE AND TESTING OF HOME TEXTILES   9

Care of Home Textiles - Vacuum cleaning of Rugs and carpets, washing of curtains, draperies, bed linens and kitchen linen, Drying and &pressing; Washing Methods: Kneading and squeezing, Suction washing, Use of washing Machine; Stain Removal: Identification of stain, general procedure for stain removal, Bleaches for stain removal, optical brighteners and blues; Testing of home textiles - color fastness, shrinkage, abrasion and flammability tests.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Summarize types of home textiles and materials used for home textiles
CO2 Assess suitability of upholstery, table textiles, living room furnishing, kitchen textiles, curtains and draperies according to customer needs.
CO3 Analyse bed linen and &towels requirements in technical terms
CO4 Select floor coverings according to specific needs
CO5 Discuss about care of home textiles, washing methods, stain removal and testing of home textiles

TEXT BOOK

1 Subrata Das., Performance of Home Textiles, Wood head Publishing India PVT. LTD, 2010
2 Fundamentals of Textiles and their care, Susheela Dantiyagi. Orient Longman Ltd., New Delhi

3   Household Textiles and Laundry work, DurgaDuelkar, Athma Ram and Sons, New Delhi
4   Soft furnishing book by Kartin Cargill, Reed consumer books Limited, London

REFERENCE BOOK
1   Simplicity's (1993). Simply the best home decoration book, A fire side book as published by Simon and Schulster (New York), London. The simplicity Pattern company inc
2   Soft furnishing by Saarah Campbell and Hilary More, Mac Donald Books, QED Publishers Limited, London
3   Wingate I.B., & Mohler J.E., Textile Fabrics & Their Selection, Prentice Hall Inc, New York
4   Alexander N.G., Designing Interior Environment, Mass Court Brace Covanorich, New York, 1972

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OPEN ELECTIVE

HTOE301 PRODUCT DESIGN

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

1   To acquire the basic concepts of product design and development process
2   To understand the engineering and scientific process in executing a design from concept to finished product
3   To study the key reasons for design or redesign.

Unit 1   9
Definition of a product; Types of product; Levels of product; Product-market mix; New product development (NPD) process; Idea generation methods; Creativity; Creative attitude; Creative design process; Morphological analysis; Analysis of interconnected decision areas; Brain storming.

Unit 2   9
Product life cycle; The challenges of Product development; Product analysis; Product characteristics; Economic considerations; Production and Marketing aspects; Characteristics of successful Product development; Phases of a generic product development process; Customer need identification; Product development practices and industry-product strategies

Unit 3   9
Product design; Design by evolution; Design by innovation; Design by imitation; Factors affecting product design; Standards of performance and environmental factors; Decision making and iteration; Morphology of design (different phases); Role of aesthetics in design.

Unit 4   9
Introduction to optimization in design; Economic factors in design; Design for safety and reliability; Role of computers in design; Modeling and Simulation; The role of models in

engineering design; Mathematical modeling; Similitude and scale models; Concurrent design; Six sigma and design for six sigma; Introduction to optimization in design; Economic factors and financial feasibility in design; Design for manufacturing; Rapid Prototyping (RP); Application of RP in product design; Product Development versus Design.

Unit 5   9

Design of simple products dealing with various aspects of product development; Design starting from need till the manufacture of the product,

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Understand the basic concepts of product design and development process.
CO2   Illustrate the methods to define the customer needs.
CO3   Describe an engineering design and development process.
CO4   Understand the intuitive and advanced methods used to develop and evaluate a concept.
CO5   Apply modelling and embodiment principles in product design and development process.

REFERENCE BOOK

1   Product Design and Development, Karl T. Ulrich and Steven D. Eppinger, Tata McGraw–Hill edition.
2   Engineering Design –George E. Dieter.
3   An Introduction to Engineering Design methods Vijay Gupta.
4   Merie Crawford : New Product management, McGraw-Hill Irwin.
5   Chitale A K and Gupta R C, "Product Design and Manufacturing", Prentice Hall of India, 2005.
6   Kevin Otto and Kristin Wood, Product Design, Techniques in Reverse Engineering and New Product Development, Pearson education.

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HTOE202 INTRODUCTION TO E-GOVERNANCE

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To cover the concepts of e-Governance and to understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

Unit 1   9

Exposure to emerging trends in ICT for development; Understanding of design and implementation of e-Government projects, e-governance lifecycle.

Unit 2   9

Need for Government Process Re-engineering (GPR); National e-Governancelan (NeGP) for India; SMART Governments & Thumb Rules

Unit 3   9

Architecture and models of e-Governance, including Public Private Partnership (PPP); Need for In- novation and Change Management in e-Governance; Critical Success Factors; Major issue including corruption, resistance for change, e-Security and Cyber laws

Unit 4   9

Focusing on Indian initiatives and their impact on citizens; Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context. Visits to local e-governance sites (CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

Unit 5   9

Mini Projects by students in groups – primarily evaluation of various e-governance projects.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

Through exposure to introductory ideas and practices followed in a selected number of e-Gover- nance initiatives in India, the course will help students to understand and appreciate the essence of e-Governance.

REFERENCE BOOK
1   Managing Transformation –Objectives to Outcomes. J Satyanarayana, Prentice HallIndia
2   The State, IT and Development. Kenneth Kenniston, RK Bagga and Rohit Raj Mathur, Sage Publications India PvtLtd.
3   e-Government -The Science of the Possible. J Satyanarayana, Prentice Hall,India
4   http://www.csi-sigegov.org/publications.php
5   https://negd.gov.in
6   https://www.nisg.org/case-studies-on-e-governance-in-india

HTOE304 ENGINEERING ECONOMICS & ACCOUNTANCY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

1   To acquire knowledge of basic economics to facilitate the process of economic decision making
2   To acquire knowledge on basic financial management aspects.
3   To develop the basic skills to analyze financial statements.

Unit 1   INTRODUCTION   9

Managerial Economics; Relationship with other disciplines; Firms: Types, objectives and goals; Managerial decisions; Decision analysis.

Unit 2   DEMAND & SUPPLY ANALYSIS   9
   Demand; Types of demand; Determinants of demand; Demand function; Demand elasticity;
   Demand forecasting; Supply; Determinants of supply; Supply function; Supply elasticity.

Unit 3   PRODUCTION AND COST ANALYSIS   9
   Production function; Returns to scale; Production optimization; Least cost input; Isoquants;
   Managerial uses of production function; Cost Concepts; Cost function; Types of Cost;
   Determinants of cost; Short run and Long run cost curves; Cost Output Decision;
   Estimation of Cost.

Unit 4   PRICING   9
   Determinants of Price; Pricing under different objectives and different market structures;
   Price discrimination; Pricing methods in practice; Role of Government in pricing control.

Unit 5   FINANCIAL ACCOUNTING (ELEMENTARY   9
           TREATMENT)
   Balance sheet and related concepts; Profit & Loss Statement and related concepts; Financial
   Ratio Analysis; Cash flow analysis; Funds flow analysis; Comparative financial statements;
   Analysis & Interpretation of financial statements; Investments; Risks and return evaluation
   of investment decision; Average rate of return; Payback Period; Net Present Value; Internal
   rate of return,

                                                              Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
   CO1   Understand the macro-economic environment of the business and its impact on
         enterprise
   CO2   Understand cost elements of the product and its effect on decision making
   CO3   Prepare accounting records and summarize and interpret the accounting data for
         managerial decisions
   CO4   Understand accounting systems and analyze financial statements using ratio analysis
   CO5   Understand the concepts of financial management and investment

REFERENCE BOOK
   1   Premvir Kapoor, Sociology & Economics for Engineers, Khanna Publishing House,
       New Delhi, 2018
   2   McGuigan, Moyer and Harris, 'Managerial Economics; Applications, Strategy and
       Tactics', Thomson South Western, 10th Edition, 2005.
   3   Prasanna Chandra. 'Fundamentals of Financial Management', Tata Mcgraw Hill
       Publishing Ltd., 4th edition, 2005.
   4   Samuelson. Paul A and Nordhaus W.D., 'Economics', Tata Mcgraw Hill Publishing
       Company Limited, New Delhi, 2004.
   5   Paresh Shah, 'Basic Financial Accounting for Management', Oxford University
       Press, New Delhi, 2007. 3. Salvatore Dominick, 'Managerial Economics in a global
       economy'. Thomson South Western, 4th Edition, 2001

HTOE309 ENERGY CONSERVATION AND AUDIT

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

1   Undertake energy conservation and energy audit.

Unit 1   ENERGY CONSERVATION BASICS ENERGY   9
          SCENARIO

Primary and Secondary Energy, Energy demand and supply, National scenario. Energy conservation and Energy audit; concepts and difference Indian Electricity Act 2001; relevant clauses of energy conservation BEE and its Roles MEDA and its Roles Star Labelling: Need and its benefits.

Unit 2   ENERGY CONSERVATION IN ELECTRICAL   9
          MACHINES

Need for energy conservation in induction motor and transformer. Energy conservation techniques in induction motor by: Improving Power quality. Motor survey Matching motor with loading. Minimizing the idle and redundant running of motor. Operating in star mode. Rewinding of motor. Replacement by energy efficient motor Periodic maintenance Energy conservation techniques in Transformer. Loading sharing Parallel operation Isolating techniques. Replacement by energy efficient transformers. Periodic maintenance. Energy Conservation Equipment: Soft starters, Automatic star delta convertor, Variable Frequency Drives, Automatic p. f. controller (APFC), Intelligent p. f. controller (IPFC) Energy efficient motor; significant features, advantages, applications and limitations. Energy efficient transformers, amorphous transformers; epoxy Resin cast transformer / Dry type of transformer.

Unit 3   ENERGY CONSERVATION IN ELECTRICAL   9
          INSTALLATION SYSTEMS

Aggregated Technical and commercial losses (ATC); Power system at state, regional, national and global level.

Technical losses; causes and measures to reduce by.

a) Controlling I2 R losses.

b) Optimizing distribution voltage

c) Balancing phase currents

d) Compensating reactive power flow

Commercial losses: pilferage, causes and remedies

Energy conservation equipment: Maximum Demand Controller , kVAR Controller, Automatic Power Factor controller(APFC)

Energy Conservation in Lighting System

a) Replacing Lamp sources.

b) Using energy efficient luminaries.

c) Using light controlled gears.
d) Installation of separate transformer / servo stabilizer for lighting.
e) Periodic survey and adequate maintenance programs.
Energy Conservation techniques in fans, Electronic regulators.

| Unit 4 | ENERGY CONSERVATION THROUGH COGENERATION AND TARIFF | 9 |

Co-generation and Tariff; concept, significance for energy conservation Co-generation Types of cogeneration on basis of sequence of energy use (Topping cycle, Bottoming cycle) Types of cogeneration basis of technology (Steam turbine cogeneration, Gas turbine cogeneration, Reciprocating engine cogeneration). Factors governing the selection of cogeneration system. Advantages of cogeneration. Tariff: Types of tariff structure: Special tariffs; Time-off-day tariff, Peak-off-day tariff, Power factor tariff, Maximum Demand tariff, Load factor tariff. Application of tariff system to reduce energy bill.

| Unit 5 | ENERGY AUDIT OF ELECTRICAL SYSTEM | 9 |

Energy audit (definition as per Energy Conservation Act) Energy audit instruments and their use. Questionnaire for energy audit projects. Energy flow diagram (Sankey diagram) Simple payback period, Energy Audit procedure (walk through audit and detailed audit). Energy Audit report format.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1	Interpret energy conservation policies in India.
CO2	Implement energy conservation techniques in electrical machines.
CO3	Apply energy conservation techniques in electrical installations.
CO4	Use Co-generation and relevant tariff for reducing losses in facilities.
CO5	Undertake energy audit for electrical system

REFERENCE BOOK

1   Guide Books No. 1 and 3 for National Certification Examination for Energy Managers and Energy Auditors, Bureau of Energy Efficiency (BEE), Bureau of Energy Efficiency (A Statutory body under Ministry of Power, Government of India) (Fourth Edition 2015).
2   O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi
3   Henderson, P. D., India - The Energy Sector, University Press, Delhi, 2016. ISBN: 978- 0195606539
4   Turner, W. C., Energy Management Handbook, Fairmount Press, 2012, ISBN 9781304520708
5   Sharma, K. V., Venkataseshaiah; P., Energy Management and Conservation, I K International Publishing House Pvt. Ltd; 2011 ISBN 9789381141298
6   Mehta ,V. K., Principles of Power System, S. Chand &Co.New Delhi, 2016, ISBN 9788121905947

7 Singh, Sanjeev; Rathore, Umesh, Energy Management, S K Kataria&Sons,New Delhi ISBN-13: 9789350141014

8 Desai, B. G.; Rana, J. S.; A. Dinesh, V.; Paraman, R., Efficient Use and Management of Electricity in Industry, Devki Energy Consultancy Pvt. Ltd.

9 Chakrabarti, Aman, Energy Engineering And Management, e-books Kindle Edition

HTOE310 RENEWABLE ENERGY TECHNOLOGIES

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

1 To understand present and future scenario of world energy use.
2 To understand fundamentals of solar energy systems.
3 To understand basics of wind energy. 445 Open Elective Courses
4 To understand bio energy and its usage in different ways.
5 To identify different available non-conventional energy sources.

Unit 1   INTRODUCTION   9
World Energy Use; Reserves of Energy Resources; Environmental Aspects of Energy Utilisation; Renewable Energy Scenario in India and around the World; Potentials; Achievements / Applications; Economics of renewable energy systems.

Unit 2   SOLAR ENERGY   9
Solar Radiation; Measurements of Solar Radiation; Flat Plate and Concentrating Collectors; Solar direct Thermal Applications; Solar thermal Power Generation Fundamentals of Solar Photo Voltaic Conversion; Solar Cells; Solar PV Power Generation; Solar PV Applications.

Unit 3   WIND ENERGY   9
Wind Data and Energy Estimation; Types of Wind Energy Systems; Performance; Site Selection; Details of Wind Turbine Generator; Safety and Environmental Aspects.

Unit 4   BIO-ENERGY   9
Biomass direct combustion; Biomass gasifiers; Biogas plants; Digesters; Ethanol production; Bio diesel; Cogeneration; Biomass Applications.

Unit 5   OTHER RENEWABLE ENERGY SOURCES   9
Tidal energy; Wave Energy; Open and Closed OTEC Cycles; Small Hydro-Geothermal Energy; Hydrogen and Storage; Fuel Cell Systems; Hybrid Systems.

                                                    Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to
CO1   Understand present and future energy scenario of the world.
CO2   Understand various methods of solar energy harvesting.
CO3   Identify various wind energy systems.

CO4   Evaluate appropriate methods for Bio energy generations from various Bio wastes.

CO5   Identify suitable energy sources for a location.

REFERENCE BOOK

1   O.P. Gupta, Energy Technology, Khanna Publishing House, Delhi (ed. 2018)

2   Renewable Energy Sources, Twidell, J.W. & Weir, A., EFN Spon Ltd., UK, 2006.

3   Solar Energy, Sukhatme. S.P., Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.

4   Renewable Energy, Power for a Sustainable Future, Godfrey Boyle, Oxford University Press, U.K., 1996

5   Fundamental of Renewable Energy Sources, GN Tiwari and MK Ghoshal, Narosa, New Delhi, 2007.

6   Renewable Energy and Environment-A Policy Analysis for India, NH Ravindranath, UK Rao, B Natarajan, P Monga, Tata McGraw Hill.

7   Energy and The Environment, RA Ristinen and J J Kraushaar, Second Edition, John Willey & Sons, New York, 2006.

8   Renewable Energy Resources, JW Twidell and AD Weir, ELBS, 2006.

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OPEN ELECTIVE – II

HTOE305 PROJECT MANAGEMENT

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

1   To develop the idea of project plan, from defining and confirming the project goals and objectives, identifying tasks and how goals will be achieved.

2   To develop an understanding of key project management skills and strategies.

Unit 1   CONCEPT OF A PROJECT   9

Classification of projects- importance of project management- The project life cycle-establishing project priorities (scope-cost-time) project priority matrix- work break down structure.

Unit 2   CAPITAL BUDGETING PROCESS   9

Planning- Analysis-Selection-Financing-Implementation-Review. Generation and screening of project ideas- market and demand analysis- Demand forecasting techniques. Market planning and marketing research process- Technical analysis

Unit 3   FINANCIAL ESTIMATES AND PROJECTIONS   9

Cost of projects-means of financing-estimates of sales and production-cost of production-working capital requirement and its financing-profitability projected cash flow statement and balance sheet. Break even analysis.

Unit 4   BASIC TECHNIQUES IN CAPITAL BUDGETING   9

Non discounting and discounting methods- payback period- Accounting rate of return-net present value-Benefit cost ratio-internal rate of return. Project risk. Social cost benefit analysis and economic rate of return. Non-financial justification of projects.

Unit 5   PROJECT ADMINISTRATION   9

Progress payments, expenditure planning, project scheduling and network planning, use of Critical Path Method (CPM), schedule of payments and physical progress, time-cost trade off.

Concepts and uses of PERT cost as a function of time, Project Evaluation and Review Techniques/cost mechanisms. Determination of least cost duration. Post project evaluation. Introduction to various Project management software's.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Understand the importance of projects and its phases.
CO2   Analyze projects from marketing, operational and financial perspectives.
CO3   Evaluate projects based on discount and non-discount methods.
CO4   Develop network diagrams for planning and execution of a given project.
CO5   Apply crashing procedures for time and cost optimization.

REFERENCE BOOK

1   Project planning, analysis, selection, implementation and review – Prasanna chandra – Tata McGraw Hill
2   Project Management – the Managerial Process – Clifford F. Gray & Erik W. Larson - McGraw Hill
3   Project management - David I Cleland - Mcgraw Hill International Edition, 1999
4   Project Management – Gopala krishnan – Mcmillan India Ltd.
5   Project Management-Harry-Maylor-Peason Publication

HTOE306 OPERATIONS RESEARCH

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To provide a broad and in depth knowledge of a range of operation research models and techniques, which can be applied to a variety of industrial applications.

Unit 1   9

Development, Definition, Characteristics and phase of Scientific Method, Types of models; General methods for solving operations research models.

Unit 2   9

Allocation: Introduction to linear programming formulation, graphical solution, Simplex Method, artificial variable technique, Duality principle. Sensitivity analysis.

Unit 3   9

Transportation Problem Formulation optimal solution. Unbalanced transportation problems, Degeneracy. Assignment problem, Formulation optimal solution

Unit 4   9

Sequencing: Introduction, Terminology, notations and assumptions, problems with n-jobs and two machines, optimal sequence algorithm, problems with n-jobs and three machines.

Unit 5   9

Theory of games: introduction, Two-person zero-sum games, The Maximum –Minimax principle, Games without saddle points – Mixed Strategies, 2 x n and m x 2 Games – Graphical solutions, Dominance property, Use of L.P. to games.

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1 Understand the formulation of Liner Programming
CO2 Analyze and Convert the problem into a mathematical model.
CO3 Understand and implement the transportation problems at workplace
CO4 Understand sequencing to optimize the process time for n- job and m-machine
CO5 Identify and select suitable methods for various games and apply the LP

REFERENCE BOOK

1 Operations Research: an introduction, Hamdy A. Taha, Pearson Education.
2 Operations. Research: theory and application, J.K. Sharma, Macmillan Pubishers.
3 Introduction to Operations Research: concept and cases, Frederick S. Hillier and Gerald J. Lieberman, Tata McGraw-Hill

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HTOE307 INTERNET OF THINGS

COURSE OBJECTIVES

L	T	P	C
2	1	0	3

Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry. IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc. Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems. Therefore, it is very important to learn the fundamentals of this emerging technology

Unit 1				9

Introduction to IoT; Sensing; Actuation

Unit 2   9

Basics of IoT Networking, Communication Protocols, Sensor networks

Unit 3   9

Introduction to Arduino programming, Integration of Sensors/Actuators to Arduino

Unit 4   9

Implementation of IoT with Raspberry Pi; Data Handling Analytics

Unit 5   9

Case Studies: Agriculture, Healthcare, Activity Monitoring

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

- Understanding of various aspect of IoT, know some tools and have basic implementation skills.

REFERENCE BOOK

1   https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
2   "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
3   Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)
4   "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press)
5   Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill
6   Research papers

HTOE311 DISASTER MANAGEMENT

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

Following are the objectives of this course:

1   To learn about various types of natural and man-made disasters.
2   To know pre- and post-disaster management for some of the disasters.
3   To know about various information and organisations in disaster management in India.
4   To get exposed to technological tools and their role in disaster management.

Unit 1   UNDERSTANDING DISASTER   9

Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity – Disaster and Development, and disaster management.

Unit 2   TYPES, TRENDS, CAUSES, CONSEQUENCES AND   9
          CONTROL OF DISASTERS

Geological Disasters (earthquakes, landslides, tsunami, mining); Hydro-Meteorological Disasters (floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves) Biological Disasters (epidemics, pest attacks, forest fire);

Technological Disasters (chemical, industrial, radiological, nuclear) and Manmade Disasters (building collapse, rural and urban fire, road and rail accidents, nuclear, radiological, chemicals and biological disasters) Global Disaster Trends – Emerging Risks of Disasters – Climate Change and Urban Disasters.

Unit 3   DISASTER MANAGEMENT CYCLE AND   9
          FRAMEWORK

Disaster Management Cycle – Paradigm Shift in Disaster Management. Pre-Disaster – Risk Assessment and Analysis, Risk Mapping, zonation and Microzonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development; Awareness. During Disaster – Evacuation – Disaster Communication – Search and Rescue – Emergency Operation Centre – Incident Command System – Relief and Rehabilitation – Post-disaster – Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery – Reconstruction and Redevelopment; IDNDR, Yokohama Stretegy, Hyogo Framework of Action.

Unit 4   DISASTER MANAGEMENT IN INDIA   9

Disaster Profile of India – Mega Disasters of India and Lessons Learnt. Disaster Management Act 2005 – Institutional and Financial Mechanism, National Policy on Disaster Management, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national),Non-Government and Inter Governmental Agencies

Unit 5   APPLICATIONS OF SCIENCE AND TECHNOLOGY   9
          FOR DISASTER MANAGEMENT

Geo-informatics in Disaster Management (RS, GIS, GPS and RS). Disaster Communication System (Early Warning and Its Dissemination). Land Use Planning and Development Regulations, Disaster Safe Designs and Constructions, Structural and Non Structural Mitigation of Disasters S&T Institutions for Disaster Management in India

Total: 45 Hour

COURSE OUTCOMES:

At the end of the study of this course, the students will be able to

CO1   Acquainted with basic information on various types of disasters
CO2   Knowing the precautions and awareness regarding various disasters
CO3   Decide first action to be taken under various disasters
CO4   Familiarised with organisation in India which are dealing with disasters
CO5   Able to select IT tools to help in disaster management

REFERENCE BOOK
1.   Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management
2.   Bhandani, R. K., An overview on natural & man-made disasters and their reduction, CSIR, New Delhi
3.   Srivastava, H. N., and Gupta G. D., Management of Natural Disasters in developing countries, Daya Publishers, Delhi
4.   Alexander, David, Natural Disasters, Kluwer Academic London
5.   Ghosh, G. K., Disaster Management, A P H Publishing Corporation
6.   . Murthy, D. B. N., Disaster Management: Text & Case Studies, Deep & Deep Pvt. Ltd

HTOE312 MARKETING MANAGEMENT AND FOREIGN TRADE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES
To impart knowledge to students on,
*   Marketing strategies', consumer behavior and market research, Foreign trade, agreements, documentation procedures and policies of Import / Export market.

Unit 1   MARKETING   9
Introduction to Marketing - marketing in a developing economy – Marketing of services – planning marketing mix – market segmentation – Marketing research and its applications.

Unit 2   CONSUMER BEHAVIOUR   9
Understanding Consumers - Determinants of Consumer behaviour – models of Consumer Behaviour – Indian Consumer Environment.

Unit 3   ELEMENTS OF MARKETING MIX   9
PRODUCT - PRICING - Marketing channels, Wholesaling, Retailing.
PROMOTION –Advertising, Sales promotion, Personnel selling, Publicity.
Market Research. Definition, Methods of research, Steps, Need and Importance.

Unit 4   FOREIGN TRADE   9
Definition, Importance, Types – Import, Export, Re-export; Features of foreign trade. Functions and objectives of WTO-Concepts of GATT and MFA.

Unit 5   EXPORT DOCUMENTATION   9
Order confirmation, various types of export documents, pre-shipment and post-shipment documentation, terms of sale, payment and shipment. Duty drawback, DEPB, I/E licenseexchange control regulation-foreign exchange regulation acts-export management risk-export finance.

Total: 45 Hour

COURSE OUTCOMES:
At the end of the study of this course, the students will be able to

CO1   Identify the market and segments of marketing.
CO2   Describe the concepts of consumer behaviour.
CO3   Explain the various elements involved in marketing and market research.
CO4   Define foreign trade and ~~on~~ discuss in detail the functions of WTO.
CO5   Prepare various documents required for exports

TEXT BOOK
1.   Philip Kotler, "Marketing Management", PHI publications, 2004.
2.   Raj Agarwal, "Indian Foreign Trade",Excel books,2002

REFERENCE BOOK
1.   Evans. J. R. "Marketing: Marketing In The 21st Century", 8th edition, 2003.
2.   S.Shivaramu, "Export Marketing – A practical Guide to Exporters", McGraw-Hill Book Company, 1985.
3.   D. Sinha, "Export Planning and Promotion", IIM, Calcutta, 1981.
4.   5. S.Shivaramu. "Export Marketing" – A Practical Guide to Exporters", Wheeler Publishing, ISBN: 81-7544-166-6, 1996.

PDTP Curriculam

Sl No	Category of Course	Code No	Course Title	Hours/week			Total credit Hrs/week	Credits
				L	T	P		
SEMESTER - I								
1	Programme Core	PDTP101	Fibre Science	3	0	0	3	3
2	Programme Core	PDTP102	Technology of Preparatory Processing of Textiles	4	0	0	4	4
3	Programme Core	PDTP103	Technology of Dyeing-I	4	0	0	4	4
4	Programme Core	PDTP104	Introduction to Textile Manufacture	3	0	0	3	3
5	Programme Core	PDTP105	Fibre Identification & Technical Analysis Practice	0	0	3	3	1.5
6	Programme Core	PDTP106	Preparatory Textile Processing Practice	0	0	6	6	3
7	Programme Core	PDTP107	Textile Dyeing Practice-I	0	0	6	6	3
						Total Credits		**21.5**
SEMESTER - II								
1	Programme Core	PDTP201	Textile Testing & Quality Control	4	0	0	4	4
2	Programme Core	PDTP202	Soft Silks & Personality Development	3	0	0	3	3
3	Programme Core	PDTP203	Technology of Dyeing-II	4	0	0	4	4
4	Programme Core	PDTP204	Technology of Printing-I	4	0	0	4	4
5	Programme Core	PDTP205	Textile Texting Practice	0	0	6	6	3
6	Programme Core	PDTP206	Textile Dyeing Practice-II	0	0	6	6	3
7	Programme Core	PDTP207	Computer Colour Matching Practice	0	0	3	3	1.5
						Total Credits		**22.5**
SEMESTER - III								
1	Programme Core	PDTP301	Technology of Printing –II	4	0	0	4	4
2	Programme Core	PDTP302	Technology of Finishing	4	0	0	4	4
3	Programme Core	PDTP303	Chemistry of Intermediates & Dyes	3	0	0	3	3
4	Programme Core	PDTP304	Ecology & Pollution Control in Textile Industry	3	0	0	3	3
5	Programme Core	PDTP305	Project Work	0	0	6	6	3
6	Programme Core	PDTP306	Textile Finishing Practice	0	0	6	6	3
7	Programme Core	PDTP307	Textile Printing Practice	0	0	6	6	3
						Total Credits		**23**

Syllabus

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
POST DIPLOMA IN TEXTILE PROCESSING
REGULATION 2021

SEMESTER I

PDTP101 : FIBRE SCIENCE

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

To make the students understand about the introduction of different fibres, polymers and their manufacturing processes.

Unit 1   INTRODUCTION OF TEXTILE FIBRES &   9
POLYMERS AND THEIR CLASSIFICATION

1. Fibers -Definition, Classification on fibers, important characteristics of Textile fibers:
2. Classification of polymer - Homo polymer, Co-Polymer, Atactic, Syndiotactic and isotactic polymer, branch & linear polymer.
3. Types of polymerization addition and condensation, orientation.
4. Fiber structure, Concept of Crystallinity, Amorphous region, Glass transition temperature and melting point.

Unit 2   MANUFACTURING PROCESS OF SYNTHETIC   9
FIBRES AND TEXTURIZING

1. Techniques of Spinning of manmade fibers: Wet Spinning, Dry Spinning& Melt Spinning.
2. Application of Spin Finish.
3. Texturizing, Importance of Texturizing process, Types of texturizing process.

Unit 3   STRUCTURE AND PROPERTIES OF NATURAL   9
FIBRES

1. Structure, Physical & Chemical properties of Cotton, Wool and Silk.
2. Formation of hydro and oxy cellulose.
3. Concept of Zwitter ion & Isoelectric region in Protein Fibres.

Unit 4   MANUFACTURING PROCESS OF REGENERATED   9
&POLYESTER FIBRES WITH THEIR PROPERTIES

1. Manufacturing process of viscose fiber, Cellulose acetate, Lyocell
2. Physical and Chemical properties of Viscose, cellulose acetate and Lyocell.
3. Manufacturing process of polyester fiber, Physical and chemical properties of polyester fiber.
4. Concept of heat setting.

Unit 5   MANUFACTURING PROCESS OF POLYAMIDES,   9
           POLY ACRYLONITRILE AND OTHER FIBRESWITH
           THEIR PROPERTIES

1. Manufacturing process of Nylon-6 & Nylon-66.Physical and Chemical properties of Polyamide fibers.
2. Manufacturing process of Acrylonitrile fibers. Physical and Chemical properties of Acrylonitrile fiber.
3. Manufacturing process of PE &PP fibers. Physical and Chemical properties of PE & PP fibers.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Textile fibres their structures and classification, Types of polymers and polymerization
CO2   Types of spinning techniques and texturizing process
CO3   Structure and properties of natural fibres
CO4   Properties and manufacturing process of regenerated and polyester fibre
CO5   Manufacturing processes and properties of synthetic fibres

TEXT BOOK

1   Gupta, V.B., Kothari, V.K., Manufactured Fibre Technology, Springer Netherlands, 1997
2   S P Mishra, Fibre Science and Technology, New-Age International Ltd...New Delhi, 199
3   Vaidya A A, Production of Synthetic Fibres, Prentice Hall of India, New Delhi, 1988

REFERENCE BOOK

1   Cook Gordon J, Hand Book of Textile fibre, Vol.I and II, WoodheadFibre Science series, UK, 1984
2   Ed. M Lewin and E M Pearce, Hand Book of Fibre Chemistry, Mercel Dekker Inc., 1998
3   Shenai V A, Textile Fibre, Sevak Publications, Mumbai
4   R.W. Moncrieff, Manmade Fibres, Butterworth, London
5   Gowariker V R, Viswanathan N V and Sridhar J, Polymer Science, New AgeInternational Ltd., New Delhi, 1996.
6   B.L. Deopura, B. Gupta, Man-Made Fibres.
7   Chemical Technology of Fibrous Materials by F. Sadov.

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PDTP102 : TECHNOLOGY OF PREPARATORY PROCESSING OF TEXTILES

	L	T	P	C
COURSE OBJECTIVES	4	0	0	4

To make the students understand morphology, chemical aspects and composition of raw Cotton, Wool and Silk. Study of preparatory processes of different textile fibres and evaluation of defects and damages.

Unit 1   INTRODUCTION TO PREPARATORY PROCESSES   12
        OF COTTON MATERIAL

1. Morphological and chemical aspects of Cotton.
2. Composition of Raw Cotton.
3. Dry Preparatory Process viz. Mending, Stitching, Shearing & Cropping, Spotting and Singeing.
4. Need for preparation of Grey Goods for dyeing and printing.
5. Desizing, scouring and bleaching of cotton with Hypo Chlorites, Hydrogen Peroxide and Sodium Chlorite.
6. Comparative study of various methods of bleaching.
7. Solvent scouring.
8. Introduction to Mecerization.

Unit 2   INTRODUCTION TO PREPARATORY PROCESS OF   12
        PROTEIN FIBRES

1. Morphological, Chemical aspects and composition of raw Wool and Silk.
2. Methods of scouring Wool (Suint, Emulsion, Solvent and Freezing) and its machines.
3. Milling of Woollens.
4. Methods of Degummimg silk with soap, mild alkali and enzymes.

Unit 3   STUDY OF PRETREATMENTS OF PROTEIN AND   12
        SYNTHETIC FIBRES.

1. Bleaching of Wool with Hydrogen Peroxide.
2. Bleaching of Silk with Hydrogen Peroxide.
3. Setting process for Woollens viz. Potting, Crabbing and Decatising.
4. Need for preparatory treatment for important manmade fibres viz. Polyester, Nylon and Acrylic.
5. Method of Scouring and Bleaching for Polyester, Nylon, Acrylic.

Unit 4   STUDY OF DIFFERENT TEXTILE WET   12
        PROCESSING MACHINES

1. Description and working of Singeing M/c, Kier and J-Box.
2. Preparatory process sequences for different cotton Materials (for white, to be Dyed in pale and medium shades and / or to be printed goods).
3. Working & Principle of machines like Hydroextractor, Winch & Scutcher.

Unit 5   STUDY OF CONTINUOUS BLEACHING AND GARMENT   12
          WASHING MACHINES. STUDY OF AUXILIARIES AND
          DEFECTS AND DAMAGES IN PREPARATORY PROCESSES.
     1. Working of continuous bleaching ranges and garment washing machines.
     2. A review of chemical auxiliaries used in preparatory processing of textile viz.
        Surfactants, sequestering agents, wetting agents, detergents and optical brightners.
     3. Defects & damages caused in Singeing, Scouring and Bleaching.

                                                          Total: 60 Hour

COURSE OUTCOMES
At the end of the study of this course, the students will be able to learn
   CO1   Structure of cotton, Dry and wet preparatory processes of cotton
   CO2   Structure and Preparatory processes of protein fibres
   CO3   Bleaching of protein fibres and preparatory process for man made fibres
   CO4   Machines used in preparatory processes and process sequence for different cotton
         materials.
   CO5   Defects caused in preparatory processes, working of bleaching ranges and
         chemical auxiliaries used in preparatory processes

TEXT BOOK
   1   Chemical Processing of Textiles by Dr. C.V. Kaushik and Mr. Antao Irwin Josico,
       NCUTE
   2   Technology of Scouring and Bleaching, Trotman E.R., Griffin, London, 1968.
   3   Technology of Textile processing Vol. II, III & VI by Dr. V AShenai
   4   Technology of Dyeing by Dr. V A Shenai
   5   Guide to Wet Textile Processing Machines by J. N. Shah, Elsevier Science &
       Technology

REFERENCE BOOK
   1   Technology of Bleaching and Mercerizing, Shenai V.A., Sevak Publication,
       Bombay, Vol. - 3, 3rd edition, 2003
   2   Textile Bleaching, Steven A.B., Pitman and Sons, London.
   3   Textile Preparation and Dyeing, Asim Kumar Roy Choudhury, Oxford and IBH
       Publishing Co. Pvt. Ltd., 2006.

                PDTP103 : TECHNOLOGY OF DYEING – I
                                              L   T   P   C
COURSE OBJECTIVES   4   0   0   4
   To make the students understand the basic concepts of dyeing. Definition of dyes and
   pigments. Classification of dyes according to their application methods. Process of dyeing
   for cotton, wool and silk.

Unit 1   INTRODUCTION OF DYES AND PIGMENTS   12
          &CLASSIFICATION OF DYES

   1. Definition of Dyes, Pigments, Auxochrome and Chromophore.
   2. Classification of dyes with respect to their application on Textile Fibres.
   3. Criteria for selection of dyes.
   4. Basic concepts involved in dyeing such as substantivity, Solubility, affinity, theory of dyeing & role of Zeta Potential in Cotton.
   5. Basic parameters of dyeing viz. Percentage of shade, Percentage of exhaustion, percentage expression and effects of MLR.

Unit 2   PRINCIPLES AND APPLICATION METHODS OF   12
          DIRECT, AZOIC AND SULPHUR DYES.

   1. Principles and methods of application of Direct Dyes with function of chemicals used and effect of process conditions.
   2. After treatments of cotton dyed with Direct dyes.
   3. Principle and methods of application of Azoic with function of chemicals used and effect of process conditions.
   4. Principle and methods of application of Sulphur Dyes with function of chemicals used and effect of process conditions.

Unit 3   PRINCIPLE AND APPLICATION METHOD OF VAT   12
          AND REACTIVE DYES

   1. Classification of Vat dyes in accordance with their chemical constitution
   2. Principle and methods of application of vat dyes on cotton
   3. Principle and methods application of Solubilized vat dyes on cotton
   4. Classification of Reactive dyes. Concept of Mono functional and Bi-functional Reactive dyes.
   5. Principle and methods of application of Reactive dyes on cotton.

Unit 4   MECHANISM AND METHOD OF DYEING OF WOOL   12
          AND SILK

   1. Structural concept of wool and silk in relation to their dyeing i.e. amphoteric character and iso-electric region
   2. Dyeing of wool with Acid dyes, Chrome dyes and Metal Complex dyes
   3. Dyeing of Silk with Acid dyes& Metal Complex dyes
   4. Mechanism of acid dye dyeing on wool and silk

Unit 5   WORKING PRINCIPLE OF WET PROCESSING   12
          MACHINES AND CONCEPT OF BANNED DYES

   1. Concept of Banned dyes.
   2. Description and working of various machines used for wet processing viz. Jigger, Winch, Cabinet hank dyeing machine, Yarn Package dyeing machine and Padding Mangle

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Classification of Dyes, Basic concepts &parameters used in dyeing

CO2   Application of direct, azoic and sulphur dyes on cotton

CO3   Application of Vat, solubilized vat and reactive dyes on cotton

CO4   Application of acid, chrome and metal complex dyes on protein fibres

CO5   Banned dyes and working of various processing machines

TEXT BOOK

1   Chemical Processing of Textiles by Dr. C.V. Kaushik and Mr. Antao Irwin Josico, NCUTE

2   Technology of Scouring and Bleaching, Trotman E.R., Griffin, London, 1968.

3   Technology of Textile processing Vol. II, III & VI by Dr. V AShenai

4   Technology of Dyeing by Dr. V AShenai

5   Guide to Wet Textile Processing Machines by J. N. Shah, Elsevier Science & Technology

6   Chemical Processing of Textiles by M.V.sapatnekar

REFERENCE BOOK

1   Technology of Bleaching and Mercerizing, Shenai V.A., Sevak Publication, Bombay, Vol. - 3, 3rd edition, 2003

2   Textile Bleaching, Steven A.B., Pitman and Sons, London.

3   Textile Preparation and Dyeing, Asim Kumar Roy Choudhury, Oxford and IBH Publishing Co. Pvt. Ltd., 2006

4   Dyeing and Chemical Technology of Textile Fibres by E.R.Tortman

5   Glimpses of Textile Processing by R.R.Chakarvarty

6   Hand book of textile processing machinery by R.S. Bhagwat

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PDTP104 : INTRODUCTION TO TEXTILE MANUFACTURE

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To make the students understand about fibres, Spinning, Weaving preparatory and types of looms

Unit 1   INTRODUCTION OF TEXTILE FIBRES,YARN&   9
FABRIC

1. Basic terms and definition used in textile manufacture.
2. Introduction to various textile fibres used in the industries.
3. Classification of various types of yarns (single, folded & fancy etc.) & overview of their general properties,
4. Classification of various types of fabrics (Woven, Knitted & non-woven fabrics etc.)

Unit 2   INTRODUCTION OF SPINNING   9

1. Flow chart of spinning for cotton, woollens and worsted yarn.
2. Outline of processes involved in cotton spinning such as Blow room. Carding, drawing, combing, speed frame, ring frame & winding process.
3. Outline of reeling, throwing process involved in silk.

Unit 3   INTRODUCTION OF WEAVING PREPARATORY.   9
1. Defects and Damages in yarn manufacture.
2. Yarn numbering systems and basic calculations.
3. Outline of weaving preparatory process such as weft winding, warping, sizing, Beaming, Drawing and denting.
4. Outline of sizing process with its objectives and ingredients used.

Unit 4   INTRODUCTION OF ELEMENTARY WEAVES &   9
           KNITTING
1. Introduction of elementary weaves (Plain, twill, satin, sateen).
2. Introduction of knitting and types of knitting machines.
3. Comparison between general properties of woven and knitted fabrics.
4. Machines used in knitting

Unit 5   INTRODUCTION OF DIFFERENT LOOMS AND   9
           DEFECTS OF FABRIC.
1. Introduction of different types of handlooms, power looms and shuttleless looms.
2. Study of passage of warp on loom, calculations for yarn weight and fabric weight.
3. Study of various types fabric defects.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Basic Terms and textile fibres used in textile manufacturing, classification of yarns and fabrics

CO2   Spinning processes for cotton/woollen/worsted yarn and silk reeling

CO3   Various weaving preparatory processes, yarn numbering system

CO4   Introduction of elementary weaves and type of knitting machines

CO5   Types of handlooms, yarn/fabric weight calculation and types of fabric defects

TEXT BOOK

1   Marks. R and Robbinson. A. T. C, "Principle of Weaving", 1976.
2   Talukdar M. K., Sriramulu P. K. and Ajgaonkar D. B, "Weaving Machine, Mechanism, Management",1998.
3   Banerjee N.N, "Weaving Mechanism", 1982.
4   Sengupta, "Weaving Calculation", 1963.
5   TAI, "Weaving Tablets", 2013.
6   Lord.P.R and Mohamad, "Weaving: Conversion from yarn to Fabric", 1982.
7   Textile Mathematics Vol 3 by J E Booth.
8   Fabric Manufacture Vol 1 & 2 by NCUTE.

9   V.B. Gupta & V.K. Kothari, Manufactured Fibre Technology.

REFERENCE BOOK
1   Hanton, WA, "Mechanics for Textiles Student an Introduction to the study of mechanics for Textiles student", 1960.
2   Greenwood, Hony., "Hand book of weaving and manufacturing", 2nd Edition, 1954.
3   Rama Verma, "Handloom weaving", 1959.
4   David Ezakia, "Preparatory Process for weaving with calculation: including Development of the modern Power Loom"
5   Z Grosicki, "Watsons Textile Design and Colour ", 2nd Edition

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PDTP105 : FIBRE IDENTIFICATION & TECHNICAL ANALYSIS PRACTICE

	L	T	P	C
	0	0	3	1.5

COURSE OBJECTIVES

To make the students understand about estimation of various auxiliaries used in processing and identifications of fibres

LIST OF PRACTICALS /ACTIVITIES
1. Analysis of water sample for assessment of various types of hardness.
2. Estimation of Soda Ash sample assessment of its percentage purity.
3. Estimation of Caustic Soda sample for assessment of its percentage purity.
4. Estimation of Bleaching powder sample for assessment of its percentage purity.
5. Estimation of Hydrogen peroxide sample for assessment of its percentage purity.
6. Estimation of Sulphuric acid sample for assessment of its percentage purity.
7. Estimation of Hydrochloric acid sample for assessment of its percentage purity.
8. Estimation of Sodium hydrosulphite sample for assessment of its percentage purity.
9. Identification of textile fibres by microscopic test.
10. Identification of textile fibres by burning test.
11. Identification of textile fibres by solubility test.
12. Analysis of blended yarn and fabric comprising of cotton, viscose and polyester.

Total: 30 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Assessment of water hardness
CO2   Estimation of alkalies
CO3   Estimation of bleaching agents
CO4   Estimation of mineral acid
CO5   Tests for identification of textile fibres and blend analysis

-

PDTP106 : PREPARATORY TEXTILE PROCESSING PRACTICE

	L	T	P	C
COURSE OBJECTIVES	0	0	6	3

To make the students understand about the preparatory processes of cotton, protein fibres and polyester.

LIST OF PRACTICALS /ACTIVITIES

1. Desizing of cotton fabric by Acid Steeping Method.
2. Desizing of cotton fabric by Enzyme Method.
3. Scouring of cotton yarn/fabric.
4. Bleaching of cotton yarn/fabric with Hypochlorite Method.
5. Bleaching of cotton yarn/fabric with Hydrogen Peroxide Method.
6. Optional Whitening of bleached cotton fabric by opticalbrightners.
7. Degumming of Silk yarn/fabric.
8. Bleaching of Silk yarn/fabric.
9. Scouring of Woollens yarn/fabric.
10. Bleaching of Woollens yarn/fabric.
11. Bleaching of pure synthetic fabric with sodium chlorite.

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Methods of desizing of cotton
CO2   Bleaching of cotton
CO3   Scouring and bleaching of wool and silk
CO4   Bleaching of synthetic fibres

-

PDTP 107 : TEXTILE DYEING PRACTICE – I

	L	T	P	C
COURSE OBJECTIVES	0	1	2	3

To make the students understand about dyeing of cotton and protein fibres with different dyes.

LIST OF PRACTICALS /ACTIVITIES

1. Dyeing of cotton with direct dyes.
2. After treatments of cotton dyed with direct dyes using cationic dye fixing agent.
3. Study of effect of temperature on dyeing of cotton.
4. Study of effect of MLR on dyeing of cotton.
5. Study of effect of electrolytes on dyeing of cotton.
6. Dyeing of cotton with azoic dyes.
7. Dyeing of cotton with vat dyes.
8. Dyeing of cotton with reactive dyes.
9. Dyeing of cotton with sulphur dyes.
10. Dyeing of cotton with solubilised vat dyes.
11. Dyeing of silk and wool with acid dyes.
12. Dyeing of silk and wool with metal complex dyes.
13. Practice on Shade Matching (self shade).

COURSE OUTCOMES

At the end of the study of this course, the students will be able to

CO1	Effect of temperature, MLR, Electrolyte on dyeing of cotton
CO2	Dyeing of cotton with various dyes
CO3	Dyeing of wool and silk
CO4	Shade matching

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SEMESTER II

PDTP201 : TEXTILE TESTING & QUALITY CONTROL

	L	T	P	C
COURSE OBJECTIVES	4	0	0	4

To make the students understand about various testing of yarn and fabric.

Unit 1   INTRODUCTION OF TEXTILE TESTING   12
1. Objectives of textile testing.
2. Importance and Methods of Sampling.
3. Elements of Statistics, Measures of Dispersion.
4. Standard Atmospheric Conditions, Humidity and its effect on Textile Testing.
5. Determination of Moisture Regain & Moisture content.

Unit 2   INTRODUCTION OF COUNT & EVENNESS TESTER   12
1. Count Testing Methods viz. Analytical Balance, Knowle's Balance, Quadrant Balance, Beesley's Balance.
2. Evenness testing using visual Examination, Cutting & weighing and Electronic Capacitance Methods.
3. Factors affecting Yarn evenness its impact on fabric properties.

Unit 3   PRINCIPLE OF TWIST AND YARN STRENGTH   12
          TESTER
1. Yarn Twist and its effect on fabric properties.
2. Measurement of twist by Straightened Fibre Method.
3. Tensile Testing of Yarn-terms and definitions.
4. Principle of strength testing e.g. C.R.L., C.R.E. and C.R.T.
5. Lea strength and single Yarn Testing Machines.
6. Instron Strength Testing equipment.

Unit 4   INTRODUCTION OF FABRIC PHYSICAL TEST   12
1. Testing of fabric Strength Ballistic, Tear Bursting strength.
2. Testing of yarn strength Concept of C.S.P.& R.K.M.
3. Pilling tendency and its measurement using I.C.I. Pilling Test.
4. Measurement of abrasion resistance.

Unit 5   INTRODUCTION OF DIFFERENT TESTS & TEXTILE   12
              TESTING TERMINOLOGY

1. Measurement of Crease Recovery.
2. Measurement of Bending length.
3. Measurement of Thickness.
4. Measurement of Drape.
5. Concept of TQM and QC.

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Objectives, elements of statistics & standard atmospheric condition for testing
CO2   Count and evenness testing methods
CO3   Twist, CRT, CRE, CRL and strength testing methods
CO4   Yarn and fabric strength testing, Measurement of pilling and abrasion resistance
CO5   Crease recovery, bending length, thickness and drape. Concept of TQM/ QC

TEXT BOOK

1   Booth J.E., "Principle of Textile Testing", Butterworth Publications, London, 1989
2   Saville B.P., "Physical Testing of Textiles", Textile Institute, Manchester, 1998
3   Kothari V. K., "Testing and Quality Management", Progress in Textile Technology Vol.1, IAFL Publications, New Delhi, 1999
4   Textile Testing by Angappan
5   Textile Testing by NCUTE

REFERENCE BOOK

1   Ruth Clock and Grace Kunz., "Apparel Manufacture – Sewn Product Analysis", Upper Sadle River Publications, New York, 2000
2   Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998
3   Sara J. Kadolph., "Quality Assurance for Textiles and Apparels", Fair child Publications, New York,1998
4   Slater K., "Physical Testing and Quality Control", The Textile Institute, Vol.23, No.1/2/3 Manchester, 1993

5   Textile testing web course content https://nptel.ac.in/courses/116/102/116102029/#
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PDTP202 : SOFT SKILLS & PERSONALITY DEVELOPMENT

	L	T	P	C
	3	0	0	3

COURSE OBJECTIVES

To make the students understand to learn soft skills, personality development and managerial skills.

Unit 1   SOFT SKILL AND ETHICAL ISSUES IN   9

MANAGEMENT

1. Introduction: Soft Skill, Ethics, Moral & Professional Skill.
2. Goal Setting, Life and Career Planning.
3. Human Perception: Understanding people.
4. Developing Potential and Self- Actualization, and Spiritual Intelligence.

Unit 2   INDIVIDUAL BEHAVIOUR AND STRATEGIC   9
          MANAGEMENT

1. SWOT-Analysis: Self-Assessment, Identifying Strength & Limitations.
2. Habits: Identifying Good and Bad Habits, Will-Power and Drives.
3. Developing Self-Esteem and Building Self-Confidence, Significance of Self-Discipline.
4. Attitudes, Types of Attitudes, Factors Affecting Attitudes.
5. Constructive Thinking Exploring & Managing Challenges.

Unit 3   PERSONALITY AND COMMUNICATION   9

1. Introduction to Personality: Personality Determinants, Theories in Personality.
2. Human Growth and Behaviour, Motivational Theory.
3. Communication Skills: Communicating Clearly, Understanding and Overcoming Barriers.
4. Intra Personal Communication and Body Language.
5. Inter Personal Communication and Relationship.

Unit 4   FUNDAMENTAL OF MANAGEMENT AND   9
          ENTREPRENEURSHIP

1. Management: Meaning, Nature and its Importance.
2. Leadership Skills: Introduction, Concept of Leadership, Qualities of a Good Leader.
3. Entrepreneurship Skill: Entrepreneurship Traits, Types of Entrepreneurs, Its Scope in Textile.
4. Team Management Skills: Concept, Team Management Techniques and its importance.
5. Role and Importance of Management in Handloom and Textile Industries.

Unit 5   SOCIAL MANAGEMENT   9

1. Critical Thinking and Problem Solving Skill, Mnemonic Techniques, Self Hypnotism.
2. Out of Box Thinking and Lateral Thinking Skill as a Tool of Creativity.
3. Life-long Learning and information Management Skill.
4. Stress Management: Type of Stress, Meditation and Concentration Techniques.
5. Presentation Skills: Preparation of Presentation, Project Reports and Resume.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Soft skill, goal setting and human perception
CO2   SWOT analysis, Habits, attitude and constructive thinking

CO3   Personality development, motivation & communication skills
CO4   Management, Leadership, Entrepreneurship, Team management skills and their
       importance
CO5   Critical thinking, presentation and information management skill, stress
       management

TEXT BOOK
1   Personality Development and Soft Skills, By Barun K. Mitra
2   Professional Ethics and Personality Development, By Nandini Srinivasan.
3   The ACE of Soft Skill, By Gopalaswamy Ramesh &Mohadeven Ramesh.
4   Communication Skills, By Sanjay Kumar &PuspaLata.
5   Management and Entrepreneurship in Indian Environment, By Vachaspati Mishra.

REFERENCE BOOK
1   Stress Management: A Comprehensive Guide to Wellness, By Edward A.
     Charlesworth and Ronold G. Nathan.
2   You Can Win: A Step by Step Tool for Top Achievers, By Shiv Khera

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PDTP203 : TECHNOLOGY OF DYEING-II

	L	T	P	C

COURSE OBJECTIVES   4   0   0   4

To make the students understand the dyeing of synthetic fibres with their methods of dyeing and working principle of different dyeing machines, study of fastness properties.

Unit 1   DYEING OF POLYESTER   12
   1. Brief description of Structural parameters of polyester making it difficult to dye.
   2. Need, Principle, Methods of Heat setting Polyester & its effect on dyeing behavior.
   3. Approaches for dyeing-Various methods of dyeing Polyester involving use of chemical and thermal energy.
   4. Carrier dyeing and H.T.H.P. dyeing of polyester.

Unit 2   WORKING OF HTHP DYEING MACHINES   12
   1. Brief description of parts and working of HTHP Beam dyeing machine, Jet Dyeing Machine, Soft Over Flow dyeing machines.
   2. Thermosol method of dyeing polyester.
   3. Outlines of the common defects and damages while dyeing polyester on above machines.

Unit 3   DYEING OF POLYAMIDES & ACRYLICS   12
   1. Structural concepts of polyamides (Nylon6 and Nylon66) affecting their dyeing behavior.
   2. Dyeing of Nylon with Disperse, Acid& Metal complex dyes.
   3. Process details including time, temperature, pH and functions of chemicals used.
   4. Structural concepts of Acrylic affecting their dyeing behavior.
   5. Introduction to Method of Dyeing Acrylic with Cationic and Disperse dyes.

Unit 4   PROCESS SEQUENCE OF DIFFERENT BLENDS,   12
         FUNCTION OF AUXILIARIES AND INTRODUCTION
         OF GARMENT DYEING MACHINE.
   1. Introduction and objectives of blending.
   2. Process sequence of blended textiles comprising of P/C, P/V, Acrylic/Wool & P/W.
   3. Function of Auxiliaries used in dyeing, viz. Levelling agents, exhausting agents, wetting agents, acid liberating agents, dispersing agents & Retarders.
   4. Working of Garment dyeing machines.

Unit 5   INTRODUCTION TO COLOUR FASTNESS   12
   1. Concept of fastness and grey scale.
   2. Determination of Washing Fastness of Dyed materials.
   3. Determination of Light Fastness of Dyed materials.
   4. Determination of Rubbing Fastness of Dyed materials.
   5. Determination of perspiration Fastness of Dyed materials.
   6. Common defects observed in dyeing and their remedies.

                                                      Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

   CO1   Factors affecting polyester dyeing, heat setting and various method of dyeing polyester
   CO2   Working of HTHP dyeing machines and their defects and damages
   CO3   Polyamide and acrylic dyeing with different dyes
   CO4   Process sequence of various blends, function of auxiliaries and garment dyeing m/c
   CO5   Determination of various fastness and common defects in dyeing

TEXT BOOK

   1   Technology of Dyeing –VI By Dr. V.A. Shenai
   2   Processing of Polyester Cellulosic Blends ByVaidya&Trivedi.
   3   Processing Synthetic Fibres By Datte & Vaidya.
   4   Chemical Processing of Textiles By Dr. C.V. Koushik and Mr. Antao Irwin Josico.
   5   Textile Chemical Processing Vol. I By Jitendra Kumar

REFERENCE BOOK

   1   Processing Synthetic Fibres By Schmidlin.
   2   Chemical Technology of Fibrous Materials By F. Sadov
   3   The Chemistry of Dyeing By John K. Wood
   4   Basic Principles of Textile Coloration By D. Broadbent

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PDTP 204 : TECHNOLOGY OF PRINTING-I

	L	T	P	C
COURSE OBJECTIVES	4	0	0	4

To make the students understand the about the Methods of Printing, preparation of blocks and Screens and Styles of printing ingredients used in printing paste.

| Unit 1 | INTRODUCTION TO TEXTILE PRINTING | 12 |

Unit 1   INTRODUCTION TO TEXTILE PRINTING   12
   1. Introduction to Printing.
   2. Preparatory processes for Printing.
   3. Introduction to Non-Mechanized and mechanized printing.
   4. Design, Colour, Layout and repeat in printing textiles.

Unit 2   PREPARATION PROCESS OF BLOCK & SCREENS   12
   1. Block making and working with blocks in printing textiles.
   2. Principle of making hand screens.
   3. Equipment and working with hand screens printing.
   4. Preparation of Printing Screens.

Unit 3   WORKING OF PRINTING MACHINES   12
   1. Advantages and disadvantages of blocks and screens.
   2. Working of Semi-automatic, fully automatic flat bed screens printing machines
   3. Working of rotary screen printing machine, making of rotary screens.
   4. Advantages and disadvantages of the above printing machines.

Unit 4   INTRODUCTION TO STYLES OF PRINTING AND   12
          INGREDIENTS OF PRINTING PASTE WITH AFTER
          TREATMENTS OF PRINTED GOODS
   1. Study of various ingredients used in print paste formulation.
   2. Introduction to styles of printing, direct, discharge and resist.
   3. After treatments of printed textiles viz. ageing, steaming and curing.
   4. Introduction to pigment printing and function of various ingredients.

Unit 5   PRINTING OF COTTON WITH SYNTHETIC AND   12
          NATURAL DYES.
   1. Direct style printing of cotton with direct dyes, reactive dyes and pigments.
   2. Advantages and disadvantages of pigment printing.
   3. Natural dyes used in printing, its limitations and advantages over synthetic dyes.
   4. Printing with Natural dyes.

                                                   Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

   CO1   Printing and preparatory processes, terms used in printing
   CO2   Block and screen printing by hand
   CO3   Working of various printing machines with its advantages and disadvantages
   CO4   Printing Styles, after treatments, Print paste formulation and pigment printing
   CO5   Direct style printing of cotton by various dyes, merits and demerits of pigment
          printing

TEXT BOOK

   1   Technology of printing by V.A. Shenai
   2   Textile Printing By D.G. Kale
   3   Textile Printing by R. S. Prayag

REFERENCE BOOK

1   Handbook of Textile processing machinery – R.S. Bhagwat1999
2   An Introduction to Textile printing by W Clarke.

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PDTP205 : TEXTILE TESTING PRACTICE

	L	T	P	C
COURSE OBJECTIVES	0	0	6	3

Testing of yarn and fabric with evaluation of fastness properties.

LIST OF PRACTICALS /ACTIVITIES

1. Determination of count of yarn by Beesley's/Knowles/Quadrant Balances.
2. Determination of count of yarn by using Wrap reel and Physical Balance.
3. Assessment of yarn evenness using visual assessment instruments.
4. Determining the yarn twist on yarn twist testers.
5. Determination of yarn strength by using lea strength tester.
6. Determination of fabric tensile strength by tensile strength tester.
7. Assessment of pilling property by using pilling boxes.
8. Determining crease recovery property of fabric by creasing testers.
9. Determining fabric thickness by thickness gauge.
10. Assessment of abrasion resistance.
11. Determination of class of dye on coloured textile material/dyestuff power.
12. Assessment of washing fastness by ISO-I, II, III, IV & V.
13. Assessment of rubbing fastness of dyed fabric by using Crock meter.
14. Assessment of Sublimation fastness of dyed fabric.
15. Assessment of light fastness of coloured textiles using light fastness tester.
16. Assessment of perspiration fastness of dyed fabric

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Yarn count and yarn evenness/ twist
CO2   Yarn and fabric strength, pilling and crease recovery
CO3   Fabric thickness, abrasion resistance and class of dye on fabric
CO4   Various fastness properties

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PDTP206 : TEXTILE DYEING PRACTICE-II

	L	T	P	C
COURSE OBJECTIVES	0	1	2	3

Preparatory process of synthetic fibres and their dyeing with different dyes.

LIST OF PRACTICALS /ACTIVITIES

1. Scouring and bleaching of Polyester.
2. Scouring and bleaching of Nylon.
3. Scouring and bleaching of Acrylic.

4. Dyeing of Polyester with Disperse dyes by carrier method.
5. Dyeing of polyester with Disperse-dyes by HTHP method.
6. Dyeing of P/C with disperse and Vat/reactive dyes (solid/cross/reserve shades).
7. Dyeing of nylon with acid dyes and metal complex dyes.
8. Dyeing of nylon with disperse dyes.
9. Dyeing of acrylics with cationic dyes.
10. Dyeing of acrylics with disperse dyes.
11. Practice of shade matching (compound shades).

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1	Scouring and bleaching of synthetic fibres
CO2	Dyeing of polyester and P/C Blend in various combinations
CO3	Dyeing of nylon and acrylic
CO4	Shade matching

-

PDTP207 : COMPUTER COLOUR MATCHING PRACTICE

	L	T	P	C
	0	0	3	1.5

COURSE OBJECTIVES

Study of various modules of CCM

LIST OF PRACTICALS /ACTIVITIES

1. Calibration of spectrophotometer.
2. Colour specification (L, a, b, C, H) analysis for the given samples.
3. K/S Data Generation for the dyed/printed sample.
4. Prediction of recipe for the dyed/printed sample using CCM
5. Batch Correction of the dyed sample using CCM..
6. Measurement of delta-E / Matching of shades of the given samples.
7. Pass Fail, Shade sorting & Library.
8. Cost analysis of different recipes using CCM.
9. Metamerism Analysis of different recipes using CCM.
10. Fastness Assessment using CCM.
11. Comparison of fastness assessment between manual and CCM .
12. Whiteness index measurement of given white samples.
13. Yellowness measurement of given white samples

Total: 30 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1	Spectrophotometer and its calibration, Colour specification(L,a,b, C, H)
CO2	K/S data, recipe prediction and batch correction
CO3	Pass-Fail analysis, cost analysis and metamerism
CO4	Fastness assessment, whiteness and yellowness index

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PDTP301 : TECHNOLOGY OF PRINTING-II

	L	T	P	C

COURSE OBJECTIVES   4   0   0   4

To make the students understand about the Styles of Printing, methods of cotton, silk and polyester printing. Study of traditional methods of printing.

Unit 1   INTRODUCTION OF STYLES OF PRINTING   12
1. Introduction and Chemistry involved in discharge and resist style of printing.
2. Study of various discharging agents.
3. Methods of producing white and colour discharge effects on cotton dyed with vat, reactive and azoic colours.

Unit 2   PRINTING OF SILK   12
1. Methods and process sequences of printing with acid& metal complex dye on silk
2. Methods of producing white and colour discharge effects on silk.

Unit 3   PRINTING OF POLYESTER   12
1. Methods of printing polyester with disperse dyes by direct and discharge style of printing.
2. Methods of printing polyesters/cotton blends with pigments.

Unit 4   INTRODUCTION TO ADVANCE METHOD OF   12
           TEXTILE PRINTING
1. Transfer printing and various machines used in transfer printing on textiles & its limitations.
2. Digital printing – Chemistry and technology, study of various ink-jet system and its merits & demerits.
3. Printing of knitted garments.

Unit 5   Introduction to Traditional Styles of Printing   12
1. Kalamkari
2. Batik
3. Tie& Dye (Bandhani)
4. Ajrakh Printing
5. Bagru printing &Sanganeri Print
6. Khadi (White & Colored)
7. Flock printing

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Printing by discharge style on cotton
CO2   Direct and Discharge Printing of silk
CO3   Printing of polyester with disperse dyes and P/C blend with pigments

CO4   Transfer printing and Digital printing, printing of knitted goods
CO5   Traditional styles of printing

TEXT BOOK
1   Technology of printing –R.S.Prayag
2   Textile Printing-Prof.D.G.Kale
3   Technology of printing-Dr. V.A.Shenai
4   Digital Textile printing by Susan Carden

REFERENCE BOOK
1   An introduction to Textile printing-W.Clark
2   Basic Principles of Textile Colouration-A.D.broadbent
3   Textile printing-By Leslie WC Miles
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PDTP302 : TECHNOLOGY OF FINISHING

	L	T	P	C
COURSE OBJECTIVES	4	0	0	4

To make the students understand the about the textile finishing application of different finishing chemicals and their effects.

Unit 1   INTRODUCTION TO TEXTILE FINISHING   12
1. Commercial importance of finishing and its classification.
2. Resin finishing: Mechanism of creasing, Types of Resins.
3. Anti crease, wash and wear, durable press resin finishing.
4. Mercerization and structural changes taking place in mercerization.
5. Yarn and fabric mercerizing machines.
6. Liquor ammonia mercerization

Unit 2   INTRODUCTION TO FUNCTIONAL FINISHES   12
         PART-1
1. Concept of Flame proof & flame retardancy.
2. Concept of pyrolysis, Flame retardant finishes for cotton, Concept of waterproof and water repellent Finishes, Mildew proof finishes and Rot proof finishing.
3. Durable & temporary finishes, Antimicrobial, Aroma finish, UV Protection finishes, Bio-polishing.

Unit 3   INTRODUCTION TO FUNCTIONAL FINISHES   12
         PART-2
1. Soil Release Finishing: Mechanism of soil retention.
2. Various soil releases finishes for cotton, Polyester and its blends.
3. Detail study of antistatic finishes.
4. Anti pilling Finishing

Unit 4   INTRODUCTION TO MECHANICAL, FOAM FINISH   12
         & HEAT SETTING

1. Detail study about mechanical finishing of textile materials like Calendaring, Raising, Sanforising, Peach finishing.
2. Object of Heat setting.
3. Various methods of heat setting and mechanism of heat setting.
4. Foam Finishing: Detailed study of various techniques of foam application.
5. Drawbacks of foam finishing.

Unit 5   INTRODUCTION OF ADVANCE FINISHING OF   12
          POLYESTER AND SOFTENERS
1. Mechanism in the weight reduction of PET by using alkali: Micro encapsulation techniques in finishing process.
2. Study about cationic, reactive and silicon emulsion softeners.
3. Introduction to Nano Finishing.

Total: 60 Hour

COURSE OUTCOMES
At the end of the study of this course, the students will be able to learn
CO1   Finishing and its classification, Anti crease finishing & mercerization
CO2   Flame proof & flame retardant finish, water proof & water repellent finish & other functional finish
CO3   Soil release, anti static and anti pilling finishes
CO4   Various mechanical finishes, heat setting and foam finishing
CO5   Advance finishing techniques and types of softeners

TEXT BOOK
1   Technology of finishing by V.A.Shenai
2   Technology of finishing by R.S. Prayag
3   Textile finishing by A.J.Hall
4   Handbook of textile processing machineries by R.S.Bhagwat

REFERENCE BOOK
1   Textile – Reference –Book-For-Finishing By Pietro Bellini, FerruccioBonetti, Easter-Franzetti.
2   The Finishing Textile Fabric (Woolen, Worsted & Others Cloth) By Roberts Beasumount.
3   Textile Fibers, Dyes, Finishes and Processes by Howard L. Needles.
4   Chemistry & Technology of Fabric Preparation & Finishing By Dr. Charles Tomasino.
5   Chemistry Technology of Fibrous Materials by F. Sadov.
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PDTP303 : CHEMISTRY OF INTERMEDIATES & DYES

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To make the students understand about the Historical importance of natural dyes,

Chemistry of dyes and intermediates and process of synthetic dyes.

Unit 1	INTRODUCTION OF DYES	9

1. A brief introduction of natural and synthetic dyes.
2. Raw materials and coaltar distillation.
3. Unit process in organic synthesis such as Halogenation, Nitration, Sulphonation, Esterification, Hydrogenation and Diazotisation with suitable examples.

Unit 2	INTRODUCTION TO CLASSIFICATION OF SYNTHETIC DYES.	9

1. Classification of dyes on the basis of their chemical structure such as azines, oxazines, xanthenes, acridines, thiozols, quinolines,cynanines, diphenyl and triphenyl methane dyes,azo dyes, nitro and nitroso dyes.
2. Relationship between dye structure, application and dye fibre interaction.

Unit 3	INTRODUCTION TO CHEMISTRY OF DYES	9

1. Chemistry of anthraquinone vat dyes, indigoid and thioindigoid dyes, solubilised vat dyes, sulphurcolours, reactive dyes, disperse dyes and Fluorescent Brightening agents.

Unit 4	INTRODUCTION TO CHEMISTRY OF DYES INTERMEDIATES	9

1. Study of important intermediates from Benzene, Indanthrene, Chlorobenzene, nitro benzene, aniline, phenol and salicylic acid, Naphthalene and anthracene.
2. Chemical structure of H-Acid and BON Acid.

Unit 5	SYNTHESIS OF DIFFERENT DYES	9

1. Preparation of each dye :Napthol AS, Indigotin, Fast Red TR base, Rhodamine B, Auromine, Methylene Blue, Alizarine, Caledon Jade Green, Indanthrene Blue.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1	Natural & synthetic dyes, raw materials and various unit processes in synthesis of dyes
CO2	Classification of dyes based on chemical structure and dye fibre interaction
CO3	Chemistry of dyes
CO4	Chemistry of dye intermediates
CO5	Preparation of dyes

TEXT BOOK

1	Synthetic Dyes by Gurdeep R. Chatwal
2	Chemistry of Synthetic Dyes Vol. I-VIII by Venkatraman
3	Chemistry of dyes and principle of dyeing by V.A. Shenai
4	Handbook of Synthetic Dyes & Pigments by K.M. Shah

REFERENCE BOOK
1   Colorant and Auxiliaries Volume _ 1 Colorants by John Shore
2   Colorant and Auxiliaries Volume _ 2 Colorants by John Shore
3   Textile Dyes by Mansoor Iqbal
4   Industrial Dyes Chemistry, Properties, Application by K. Humnger
5   Text Book of Dyes by M.G. Arora

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PDTP304 : ECOLOGY& POLLUTION CONTROL IN TEXTILE INDUSTRY

	L	T	P	C
COURSE OBJECTIVES	3	0	0	3

To make the students understand about the importance of ecological system and different types of pollution in textile industry.

Unit 1   INTRODUCTION OF ENVIRONMENT AND   9
          POLLUTION
   1. Environment, Types-Natural and manmade Environment, Components of Environment, Segments of Environment, Atmosphere.
   2. Pollution, Types of Pollution viz. Air, Water, Soil, Noise and Thermal pollution.
   3. Overview of environmental pollution in Textile Industries.
   4. Environmental pollution & its harmful effects on human beings, vegetation inert material and physical features of atmosphere.
   5. Pollutants, Types, Brief description on pollutants in Textiles.

Unit 2   TYPES OF POLLUTION   9
   1. Air Pollution-Definition, causes of Air Pollution.
   2. Classification, Sources & Characteristics of important Air Pollutants.
   3. Sources of Air Pollution in a Textile mill.
   4. Air Quality Standards.
   5. Indoor and outdoor air pollution.
   6. Study of Harmful Chemicals used in Textile Industry.

Unit 3   INTRODUCTION OF WATER POLLUTION &   9
          PARAMETERS
   1. Water Pollution-Definition and Classification.
   2. Various sources of waste water in wet processing.
   3. Characteristics of waste water –SS, TDS, DO, COD, BOD.
   4. Textile waste water problems, Chemical recovery and reuse.
   5. Water conservation in Textile Industry.
   6. Impact of water pollution on man, marine life & ecology of textiles.

Unit 4   INTRODUCTION OF WATER EFFLUENT   9
          TREATMENTS
   1. Methods of wastewater/Effluent treatment i.e. physical, chemical and biological treatment.
   2. Brief description of design and working of effluent treatment plant.
   3. Methods of Textile dyes house waste water decolourization and removal of organic

pollutants.
4. Tolerance level of effluents in wet processing of textiles.
5. Solid wastes, its sources, various methods of waste reduction.
6. Sludge treatment and solid waste disposal of textile Industry.

Unit 5   NOISE POLLUTION AND ECO-STANDARDS   9
1. Noise Pollution-Definition and harmful effects.
2. Preventive & control of noise pollution in Textile Industry.
3. Noise Pollution parameters.
4. New Challenges towards achievements of strict standards in Textile processing effluents.
5. Eco-standards and Eco-labels for textiles.
6. ISO 14000 & current environment policies related to Textiles Industry.

Total: 45 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn
CO1   Environment, types of pollution and their harmful effects, types of pollutants
CO2   Air pollution-classification, sources and AQS
CO3   Water pollution-classification, sources and characteristics of waste water
CO4   ETP, Tolerance level of effluents, solid waste reduction and disposal
CO5   Noise pollution, its parameters, eco standards & eco labels, ISO 14000

TEXT BOOK

1   Text book of Environmental Chemistry & Pollution Control by SS Dara
2   Sewage Disposal & Air Pollution Engineering by S.K.Garg
3   Pollution Control in Textile Industry by S.C. Bhatia, Sarvesh Devraj
4   Environment Pollution and Environmental by Padmanabh Dwivedi

REFERENCE BOOK

1   Environment Chemistry by A.K.DE
2   Perspectives in Environmental Studies by AnubhaC.P.Kaushik-Kaushik
3   Waste water Treatment by M.N.Rao. A.K.Datta
4   Air Pollution M N Rao and H V N Rao
5   A text book of Environmental Studies byTangamani & Shymala Thangamni
6   Workshop on Environment Pollution & Control in Textile Industry by BTRA
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PDTP305 : PROJECT WORK

	L	T	P	C
COURSE OBJECTIVES	0	0	6	3

To make the students understand about the practical analysis of industrial and laboratory practices to develop their practical knowledge and skill.

LIST OF PRACTICALS /ACTIVITIES

- Each student is required to submit a project report on a given topic.
- The Project may be carried out in the laboratory of the institute or preferably in a process house under actual working condition.
- The principle object of the project work is to develop the analysis skills & facilitation solutions of the day to day issues at shop floor level.
- This will also test the ability of the student to co-ordinate knowledge with the actual production activities.

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Understand the practical activities in textile industry and develop innovation attitude in further application of study/practices.

-

PDTP306 : TEXTILE FINISHING PRACTICE

	L	T	P	C
	0	0	6	3

COURSE OBJECTIVES

To make the students understand about the practices on following practical on different finishes on textile material.

LIST OF PRACTICALS /ACTIVITIES

1. Stiff finishing of given fabric using Starch/PVA
2. Soft finishing of given fabric using softener (Anionic/Cationic/Non-ionic/Reactive)
3. Buckram/back filling finish for the given fabric sample using a suitable recipe.
4. Producing of water repellent finish to the given fabric sample.
5. Application of Crease recovery finishing in given Cotton/Polyester-Cotton fabric.
6. Applications of Weight reduction finish on given polyester material.
7. Carbonisation of given P/C blends.
8. Producing of Scroopy finishing effect on silk fabric.
9. Application of Flame retardant finish to the given sample.
10. Application of Anti-microbial finish to the given sample.
11. Applications of stain release finish on the given sample.

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1   Soft and stiff finishing of cotton
CO2   Water repellent, crease recovery and weight reduction finish
CO3   Carbonisation and scroop finish
CO4   Application of functional finishes

-

PDTP307– TEXTILE PRINTING PRACTICE

	L	T	P	C
COURSE OBJECTIVES	0	0	6	3

To make the students understand about the practices on textile printing practical by using different dyes and styles on textile materials.

LIST OF PRACTICALS /ACTIVITIES

1. Printing of cotton cloth in direct style with direct colours.
2. Printing of cotton cloth in direct style with reactive colours.
3. Printing of cotton cloth in direct style with pigments colours.
4. Printing in batik style in cotton fabric.
5. Printing in bandhage/Tie & dye style on cotton fabric.
6. Printing of silk with Acid dyes in direct style.
7. Printing of silk with Metal complex dyes in direct style.
8. Printing of polyester with Disperse dyes in direct style.
9. Printing of polyester with pigments in direct style.
10. Printing of polyester/cotton blend with pigments in direct style.
11. Discharge printing of cotton fabric with vat colours on direct dyed ground.
12. Discharge printing of cotton fabric with vat colours on reactive dyed ground.
13. Discharge printing of polyester.

Total: 60 Hour

COURSE OUTCOMES

At the end of the study of this course, the students will be able to learn

CO1	Cotton printing with direct, reactive and pigment
CO2	Traditional styles of printing cotton
CO3	Silk printing with acid/ metal complex dyes
CO4	Polyester printing with disperse dyes and pigments
CO5	Discharge printing of cotton and polyester

-

Revised Structure B. Tech 1st Year (Common)

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, LUCKNOW

REVISED EVALUATION SCHEME
&
SYLLABUS

FOR

B. TECH. I YEAR

(All Branch except Agriculture (AG) and Biotechnology (BT)

ON

AICTE MODEL CURRICULUM)

[Effective from the Session: 2020-21]

Revised Structure B. Tech 1st Year (Common)

UG Stream Vs Allied Branch Classification 2020-21		Code
Stream	**Branch Name**	
Civil Engineering	Civil Engineering	CE
	Environmental Engineering	EV
Chemical Engineering	Chemical Engineering	CH
	Food Technology	FT
Computer Science	Computer Engineering (2019-20)	CS
	Computer Science	CS
	Computer Science and Engineering (CS)	**CSE**
	Computer Engineering And Information Technology	CSA
	Computer Science and Information Technology	CSIT
	Information Technology	IT
	Computer Science and Engineering (Artificial Intelligence) 2020-21	CSAI
	Computer Science and Engineering(Artificial Intelligence & Machine Learning) 2020-21	CSME
	Computer Science and Engineering (Data Science) 2020-21	CSDS
	Computer Science and Engineering (Internet Of Things) 2020-21	CSIOT
Electrical Engineering	Electrical Engineering	EE
	Electrical & Electronics Engineering	EN
Electronics Engineering	Applied Electronics & Instrumentation	AI
	Bio Medical Engineering	BM
	Instrumentation and Control Engineering, Instrumentation Engineering	IC
	Electronics Engineering	EL
	Electronics and Communication Engineering	EC
	Electronics And Computer Engineering	
	Electronics and Instrumentation Engineering	EI
	Electronics & Telecommunication Engineering	ET
Mechanical Engineering	Aeronautical Engineering	AE
	Automobile Engineering	AU
	Industrial Production Engineering	IP
	Manufacturing Technology	MT
	Mechanical and Industrial Engineering	MI
	Mechanical Engineering	ME
	Plastic Engineering	PL
	Production Engineering	PE
Textile Engineering	Carpet & Textile Chemistry	CT
	Textile Chemistry	TC
	Textile Technology	TT
	Handloom & Textile Technology 2020-21	HTT

Revised Structure B. Tech 1st Year

B. Tech 1st Year
(All branches except Bio Technology and Agriculture Engg.)
Revised Structure in accordance with AICTE Model Curriculum
Effective w.e.f. Academic Session 2020-21

SEMESTER I

3 WEEKS COMPULSORY INDUCTION PROGRAM

AICTE Guidelines in Model Curriculum: After successful completion of 160 credits, a student shall be eligible to get Under Graduate degree in Engineering. A student will be eligible to get Under Graduate degree with Honours only, if he/she completes additional university recommended courses only (Equivalent to 20 credits; NPTEL Courses of 4 Weeks, 8 Weeks and 12 Weeks shall be of 2, 3 and 4 Credits respectively) through MOOCs. For registration to MOOCs Courses, the students shall follow NPTEL Site http://nptel.ac.in/ as per the NPTEL policy and norms. The students can register for these courses through NPTEL directly as per the course offering in Odd/Even Semesters at NPTEL. These NPTEL courses (recommended by the University) may be cleared during the B. Tech degree program (not necessary one course in each semester). After successful completion of these MooCs courses the students, shall, provide their successful completion NPTEL status/certificates to the University (COE) through their college of study only. The student shall be awarded Hons. Degree (on successful completion of MOOCS based 20 credit) only if he/she secures 7.50 or above CGPA and passed each subject of that Degree Programme in single attempt without any grace marks.

Revised Structure B. Tech 1st Year
B.Tech. I Semester
(All branches except Bio Technology and Agriculture Engg.)

S. No.	Course Code	Course Title	Periods			Evaluation Scheme				End Semester		Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS101T/ KAS102T	Engineering Physics/ Engineering Chemistry	3	1	0	30	20	50		100		150	4
2	KAS103T	Engineering Mathematics-I	3	1	0	30	20	50		100		150	4
3	KEE101T/ KEC101T	Basic Electrical Engineering/ Emerging Domain in Electronics Engineering	3	0	0	30	20	50		100		150	3
4	KCS101T/ KME101T	Programming for Problem Solving / Fundamentals of Mechanical Engineering & Mechatronics	3	0	0	30	20	50		100		150	3
5	KAS151P/ KAS152P	Engineering Physics Lab/ Engineering Chemistry Lab	0	0	2				25		25	50	1
6	KEE151P/ KEC151P	Basic Electrical Engineering Lab/ Electronics Engineering Lab	0	0	2				25		25	50	1
7	KCS151P/ KAS154P	Programming for Problem Solving / English Language Lab	0	1	2				25		25	50	1
8	KCE151P/ KWS151P	Engineering Graphics & Design Lab/ Mechanical Workshop Lab	0	1	2				50		50	100	1
9	KMC101/ KMC102	AI For Engineering/ Emerging Technology for Engineering	2	0	0	15	10	25		25		50	2
10	**KNC101**	**Soft Skill I**	2	0	0	15	10	25		25			NC
11	MOOCs	(For B.Tech. Hons. Degree)*											
		Total										900	20

B.Tech. II Semester
(All branches except Bio Technology and Agriculture Engg.)

S. No.	Course Code	Course Title	Periods			Evaluation Scheme			End Semester			Total	Credits
			L	T	P	CT	TA	Total	PS	TE	PE		
1	KAS201T/ KAS202T	Engineering Physics/ Engineering Chemistry	3	1	0	30	20	50		100		150	4
2	KAS203T	Engineering Mathematics-II	3	1	0	30	20	50		100		150	4
3	KEE201T/ KEC201T	Basic Electrical Engineering/ Emerging Domain in Electronics Engineering	3	0	0	30	20	50		100		150	3
4	KCS201T/ KME201T	Programming for Problem Solving / Fundamentals of Mechanical Engineering & Mechatronics	3	0	0	30	20	50		100		150	3
5	KAS251P/ KAS252P	Engineering Physics Lab/ Engineering Chemistry Lab	0	0	2				25		25	50	1
6	KEE251P/ KEC251P	Basic Electrical Engineering Lab/ Electronics Engineering Lab	0	0	2				25		25	50	1
7	KCS251P/ KAS254P	Programming for Problem Solving / English Language Lab	0	1	2				25		25	50	1
8	KCE251P/ KWS251P	Engineering Graphics & Design Lab/ Mechanical Workshop Lab	0	1	2				50		50	100	1
9	KMC201/ KMC202	AI For Engineering/ Emerging Technology for Engineering	2	0	0	15	10	25		25		50	2
10	**KNC201**	**Soft Skill II**	2	0	0	15	10	25		25			NC
	MOOCs	(For B.Tech. Hons. Degree)*											
		Total										900	20

Mini Project or Internship (3-4 weeks) shall be conducted during summer break after II semester and will be assessed during III semester

B.Tech 1st Year
I Semester
Syllabus

Revised Structure B. Tech 1st Year

KAS-101T KAS-201T	ENGINEERING PHYSICS	3L:1T:0P	4 Credits

Unit	Topics	Lectures
I	**Relativistic Mechanics:** Frame of reference, Inertial & non-inertial frames, Galilean transformations, Michelson- Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Velocity addition theorem, Variation of mass with velocity, Einstein"s mass energy relation, Relativistic relation between energy and momentum, Massless particle.	8
II	**Electromagnetic Field Theory:** Continuity equation for current density, Displacement current, Modifying equation for the curl of magnetic field to satisfy continuity equation, Maxwell"s equations in vacuum and in non conducting medium, Energy in an electromagnetic field, Poynting vector and Poynting theorem, Plane electromagnetic waves in vacuum and their transverse nature. Relation between electric and magnetic fields of an electromagnetic wave, Energy and momentum carried by electromagnetic waves, Resultant pressure, Skin depth.	8
III	**Quantum Mechanics:** Black body radiation, Stefan"s law, Wien"s law, Rayleigh-Jeans law and Planck"s law, Wave particle duality, Matter waves, Time-dependent and time-independent Schrodinger wave equation, Born interpretation of wave function, Solution to stationary state Schrodinger wave equation for one-Dimensional particle in a box, Compton effect.	8
IV	**Wave Optics:** Coherent sources, Interference in uniform and wedge shaped thin films, Necessity of extended sources, Newton's Rings and its applications. Fraunhoffer diffraction at single slit and at double slit, absent spectra, Diffraction grating, Spectra with grating, Dispersive power, Resolving power of grating, Rayleigh"s criterion of resolution, Resolving power of grating.	8
V	**Fibre Optics & Laser:** Optics: Introduction to fibre optics, Acceptance angle, Numerical aperture, Normalized frequency, Classification of fibre, Attenuation and Dispersion in optical fibres. Laser: Absorption of radiation, Spontaneous and stimulated emission of radiation, Einstein"s coefficients, Population inversion, Various levels of Laser, Ruby Laser, He-Ne Laser, Laser applications.	8

Reference Books:

1. Concepts of Modern Physics – Aurthur Beiser (McGraw Hill)
2. Introduction to Special Theory of Relativity- Robert Resnick (Wiley)
3. Optics – Brijlal & Subramanian (S. Chand)
4. Engineering Physics: Theory and Practical- Katiyar and Pandey (Wiley India)
5. Applied Physics for Engineers- Neeraj Mehta (PHI Learning, New)
6. Engineering Physics-Malik HK and Singh AK (McGrawHill)

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. To solve the classical and wave mechanics problems
2. To develop the understanding of laws of thermodynamics and their application in various processes
3. To formulate and solve the engineering problems on Electromagnetism & Electromagnetic Field Theory
4. To aware of limits of classical physics & to apply the ideas in solving the problems in their parent streams

Revised Structure B. Tech 1st Year

KAS-102T KAS-202T	ENGINEERRING CHEMISTRY	3L:1T:0P	4 Credits

Unit	Topics	Lectures
I	**Atomic and Molecular Structure:** Molecular orbital's of diatomic molecules. Band theory of solids. Liquid crystal and its applications. Point defects in solids. Structure and applications of Graphite and Fullerenes. Concepts of Nano-materials and its application.	8
II	**Spectroscopic techniques and Applications:** Elementary idea and simple applications of Rotational, Vibrational, Ultraviolet& Visible and Raman spectroscopy.	8
III	**Electrochemistry:** Nernst Equation and application, relation of EMF with thermodynamic functions (ΔH, ΔF and ΔS). Lead storage battery. **Corrosion**; causes, effects and its prevention. **Phase Rule** and its application to water system.	8
IV	**Water Analysis;** Hardness of water, Techniques for water softening (Lime-soda, Zeolite, Ion exchange resin and Reverse osmosis method). **Fuels:** classification of fuels, Analysis of coal, Determination of calorific value (Bomb calorimeter and Dulong's methods).	8
V	**Polymer;** Basic concepts of polymer-Blend and composites, Conducting and biodegradable polymers. Preparation and application of some industrially important polymers (Buna-S, Buna-N, Neoprene, Nylon-6, nylon-6,6 and Terylene). General methods of synthesis of organo metallic compounds (Grignard reagent) and their applications.	8

Text Books:
1. University Chemistry By B.H. Mahan
2. University Chemistry By C.N.R. Rao
3. Organic Chemistry By I.L. Finar
4. Physical Chemistry By S. Glasstone
5. Engineering Chemistry By S.S. Dara
6. Polymer Chemistry By Fre W., Billmeyer
7. Engineering Chemistry By Satya Prakash

Course Outcomes: At the end of this course students will demonstrate the ability to
1. Use of different analytical instruments.
2. Measure molecular/ system properties such as surface tension, viscosity, conductance of solution, chloride and iron content in water.
3. Measure hardness of water.
4. Estimate the rate constant of reaction.

Revised Structure B. Tech 1st Year

KAS 103T	ENGINEERING MATHMATICS I	3L:1T:0P	4 Credits

COURSE OBJECTIVE:

The objective of this course is to familiarize the graduate engineers with techniques in calculus, multivariate analysis, vector calculus and linear algebra. It aims to equip the students with standard concepts and tools from intermediate to advanced level that will enable them to tackle more advanced level of mathematics and applications that they would find useful in their disciplines.

The students will learn:

- To apply the knowledge of differential calculus in the field of engineering.
- To deal with functions of several variables that is essential in optimizing the results of real life problems.
- Multiple integral tools to deal with engineering problems involving centre of gravity, volume etc.
- To deal with vector calculus that is required in different branches of Engineering to graduate engineers.
- The essential tools of matrices and linear algebra, Eigen values and diagonalization in a Comprehensive manner are required.

Unit	Topics	Lectures
I	**Matrices:** Types of Matrices: Symmetric, Skew-symmetric and Orthogonal Matrices; Complex Matrices, Inverse and Rank of matrix using elementary transformations, Rank-Nullity theorem; System of linear equations, Characteristic equation, Cayley-Hamilton Theorem and its application, Eigen values and eigenvectors; Diagonalisation of a Matrix	8
II	**Differential Calculus- I:** Introduction to limits, continuity and differentiability, Rolle's Theorem, Lagrange's Mean value theorem and Cauchy mean value theorem, Successive Differentiation (n^{th} order derivatives), Leibnitz theorem and its application, Envelope of family of one and two parameter, Curve tracing: Cartesian and Polar co-ordinates	8
III	**Differential Calculus-II:** Partial derivatives, Total derivative, Euler's Theorem for homogeneous functions, Taylor and Maclaurin's theorems for a function of two variables, Maxima and Minima of functions of several variables, Lagrange Method of Multipliers, Jacobians, Approximation of errors	8
IV	**Multivariable Calculus-I: Multiple integration:** Double integral, Triple integral, Change of order of integration, Change of variables, **Application:** Areas and volumes, Center of mass and center of gravity (Constant and variable densities)	8
V	**Vector Calculus:** Vector identities (without proof), Vector differentiation: Gradient, Curl and Divergence and their Physical interpretation, Directional derivatives. Vector Integration: Line integral, Surface integral, Volume integral, Gauss's Divergence theorem, Green's theorem and Stoke's theorem (without proof) and their applications	8

Revised Structure B. Tech 1st Year

Text Books:
1. B. V. Ramana, Higher Engineering Mathematics, McGraw-Hill Publishing Company Ltd., 2008.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 2005.
3. R K. Jain & S R K. Iyenger, Advance Engineering Mathematics, Narosa Publishing House 2002.

Reference Books:
1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. Maurice D. Weir, Joel Hass, Frank R. Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
4. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5. Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.
6. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, McGraw-Hill; Sixth Edition.
7. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson Education.
8. Advanced Engineering Mathematics. Chandrika Prasad, Reena Garg, 2018.
9. Engineering Mathemathics – I. Reena Garg, 2018.

Course Outcomes: At the end of this course students will demonstrate the ability to:

	Course Outcome (CO)	Bloom's Knowledge Level (KL)
CO 1	Remember the concept of matrices and apply for solving linear simultaneous equations.	K_1 & K_3
CO 2	Understand the concept of limit , continuity and differentiability and apply in the study of Rolle,s , Lagrange,s and Cauchy mean value theorem and Leibnitz theorems .	K_2 & K_3
CO 3	Identify the application of partial differentiation and apply for evaluating maxima, minima, series and Jacobians.	K_3 & K_5
CO 4	Illustrate the working methods of multiple integral and apply for finding area, volume, centre of mass and centre of gravity.	K_2 & K_3
CO 5	Remember the concept of vector and apply for directional derivatives, tangent and normal planes. Also evaluate line, surface and volume integrals.	K_2 & K_5

Revised Structure B. Tech 1st Year

KAS 203T	ENGINEERING MATHMATICS II	3L:1T:0P	4 Credits

(Common to all B. Tech. Courses except B. Tech., Biotechnology and Agricultural Engineering)

COURSE OBJECTIVE:

The objective of this course is to familiarize the prospective engineers with techniques in sequences, multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

The students will learn:

- The effective mathematical tools for the solutions of differential equations that model physical processes
- To apply integral calculus in various field of engineering. Apart from some other applications students will have a basic understanding of Beta and Gamma functions.
- The tool of Fourier series for learning advanced Engineering Mathematics.
- The tools of differentiation of functions of complex variables that are used in various techniques dealing with engineering problems.
- The tools of integration of functions of complex variables that are used in various techniques dealing with engineering problems.

Unit	Topic	Lectures
I	**Ordinary Differential Equation of Higher Order:** Linear differential equation of n^{th} order with constant coefficients, Simultaneous linear differential equations, Second order linear differential equations with variable coefficients, Solution by changing independent variable, Reduction of order, Normal form, Method of variation of parameters, Cauchy-Euler equation.	8
II	**Multivariable Calculus-II:** Introduction of Improper integrals, Beta & Gama function and their properties, Dirichlet's integral and its applications, Application of definite integrals to evaluate surface areas and volume of revolutions.	8
III	**Sequences and Series:** Definition of Sequence and series with examples, Convergence of sequence and series, Tests for convergence of series, (Ratio test, D' Alembert's test, Raabe's test). Fourier series, Half range Fourier sine and cosine series.	8
IV	**Complex Variable–Differentiation:** Limit, Continuity and differentiability, Functions of complex variable, Analytic functions, Cauchy- Riemann equations (Cartesian and Polar form), Harmonic function, Method to find Analytic functions, Conformal mapping, Mobius transformation and their properties.	8
V	**Complex Variable –Integration:** Complex integrals, Contour integrals, Cauchy- Integral theorem, Cauchy integral formula, Taylor's and Laurent's series (without proof), Singularities, Classification of Singularities, zeros of analytic functions, Residues, Methods of finding residues, Cauchy Residue theorem, Evaluation of real integrals of the types $\int_{0}^{2\pi} f(\cos\theta, \sin\theta)\, d\theta$, $\int_{0}^{\pi} f(\cos\theta, \sin\theta) d\theta$ and $\int_{-\pi}^{\pi} f(\cos\theta, \sin\theta) d\theta$ only.	8

Revised Structure B. Tech 1st Year

Text Books:
1. B. V. Ramana, Higher Engineering Mathematics, Tata McGraw-Hill Publishing Company Ltd., 2008.
2. B. S. Grewal, Higher Engineering Mathematics, Khanna Publisher, 2005.
3. R. K. Jain & S. R. K. Iyenger, Advance Engineering Mathematics , Narosa Publishing - House, 2002

Reference Books:
1. E. Kreyszig, Advance Engineering Mathematics, John Wiley & Sons, 2005.
2. Peter V. O'Neil, Advance Engineering Mathematics, Thomson (Cengage) Learning, 2007.
3. Maurice D. Weir, Joel Hass, Frank R.Giordano, Thomas, Calculus, Eleventh Edition, Pearson.
4. G.B Thomas, R L Finney, Calculus and Analytical Geometry, Ninth Edition Pearson, 2002.
5. James Ward Brown and Ruel V Churchill, Fourier Series and Boundary Value Problems, 8th Edition-McGraw-Hill
6. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
7. Veerarajan T., Engineering Mathematics for first year, McGraw-Hill, New Delhi, 2008.
8. Charles E Roberts Jr, Ordinary Diffrential Equations, Application, Model and Computing, CRC Press T&F Group.
9. Ray Wylie C and Louis C Barret, Advanced Engineering Mathematics, 6thEdition, McGraw-Hill.
10. James Ward Brown and Ruel V Churchill, Complex Variable and Applications, 8th Edition, McGraw-Hill.
11. P. Sivaramakrishna Das and C. Vijayakumari, Engineering Mathematics, 1st Edition, Pearson India Education Services Pvt. Ltd.
12. Advanced Engineering Mathematics By Chandrika Prasad, Reena Garg Khanna Publishing House, Delhi.

COURSE OUTCOME: After completion of the course student will be able to

	Course Outcome (CO)	**Bloom's Knowledge Level (KL)**
At the end of this course, the students will be able to:		
CO 1	Understand the concept of differentiation and apply for solving differential equations.	K_2 & K_3
CO 2	Remember the concept of definite integral and apply for evaluating surface areas and volumes.	K_1, K_3 & K_5
CO 3	Understand the concept of convergence of sequence and series. Also evaluate Fourier series	K_2 & K_5
CO 4	Illustrate the working methods of complex functions and apply for finding analytic functions.	K_3
CO 5	Apply the concept of complex functions for finding Taylor's series, Laurent's series and evaluation of definite integrals.	K_3 & K_5

Revised Structure B. Tech 1st Year

KAS-151P KAS-251P	PHYSICS LAB	0L:0T:2P	1 Credit

SUGGESTIVE LIST OF EXPERIMENTS:
Group A

1. To determine the wavelength of sodium light by Newton"s ring experiment.
2. To determine the wavelength of different spectral lines of mercury light using plane transmission grating.
3. To determine the specific rotation of cane sugar solution using polarimeter.
4. To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses
5. To measure attenuation in an optical fiber.
6. To determine the wavelength of He-Ne laser light using single slit diffraction.
7. To study the polarization of light using He-Ne laser light.
8. To determine the wavelength of sodium light with the help of Fresnel"s bi-prism.
9. To determine the coefficient of viscosity of a given liquid.
10. To determine the value of acceleration due to gravity (g) using compound pendulum.

Group B

1. To determine the energy band gap of a given semiconductor material.
2. To study Hall Effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To verify Stefan"s law by electric method.
5. To determine resistance per unit length and specific resistance of a given resistanceusing Carey Foster's Bridge.
6. To study the resonance condition of a series LCR circuit.
7. To determine the electrochemical equivalent (ECE) of copper.
8. To calibrate the given ammeter and voltmeter by potentiometer.
9. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.
10. To measure high resistance by leakage method.

List of Experiments: Any ten experiments (at least four from each group) with virtual link

	Group A	Virtual Lab Link	Alternate Lab Link
1	To determine the wavelength of sodium light by Newton's ring experiment.	https://vlab.amrita.edu/?sub=1 &brch=189&sim=335&cnt=1	http://vlabs.iitb.ac.in/vlabs-dev/labs/mit_bootcamp/engg_physics /labs/exp1/simulation/simulator4.htm l?medium=1
2	To determine the wavelength of different spectral lines of mercury light using plane transmission grating.	http://vlab.amrita.edu/?sub=1 &brch=281&sim=334&cnt=1	
3	To determine the specific rotation of cane sugar solution using polarimeter	_	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/cane-sugar-rotation-iitk/simulation.html
4	To determine the focal length of the combination of two lenses separated by a distance and verify the formula for the focal length of combination of lenses.		http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/focal-length-measurement-iitk/simulation.html

5	To measure attenuation in an optical fiber.	http://vlab.amrita.edu/index.php?sub=59&brch=269&sim=1369&cnt=2873	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/numerical-aperture-measurement-iitk/simulation.html
6	To determine the wavelength of He-Ne laser light using single slit diffraction.	http://vlab.amrita.edu/index.php/index.php?sub=1&brch=189&sim=334&cnt=1	https://youtu.be/0qIN2qHCvvs (Laser diffraction grating)
7	To study the polarization of light using He-Ne laser light.		http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/he-ne-laser-polarization-iitk/simulation.html
8	To determine the wavelength of sodium light with the help of Fresnel's bi-prism	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/fresnel-biprism-iitk/simulation.html	-
9	To determine the coefficient of viscosity of a given liquid.	https://amrita.olabs.edu.in/?sub=1&brch=5&sim=225&cnt=2	
10	To determine the value of acceleration due to gravity (g) using compound pendulum.	http://vlab.amrita.edu/?sub=1&brch=280&sim=210&cnt=2	
	Group B		
1	To determine the energy band gap of a given semiconductor material.	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/energy-band-gap-iitk/simulation.html	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/energy-band-gap-iitk/simulation.html
2	To study Hall effect and determine Hall coefficient, carrier density and mobility of a given semiconductor material using Hall effect setup.	https://vlab.amrita.edu/?sub=1&brch=282&sim=879&cnt=1	https://youtu.be/lUugrqMOY7E (Hall Effect)
3	To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.	http://vlab.amrita.edu/?sub=1&brch=192&sim=972&cnt=1	https://youtu.be/v2B0QyW8XJ0 (Variation of Magnetic Field along the axis of circular coil carrying current)
4	To verify Stefan's law by electric method..	http://vlabs.iitb.ac.in/vlabs-dev/vlab_bootcamp/bootcamp/vlabs_recbanda/labs/exp1/index.html	https://youtu.be/qyFQ31s-bAw(Stefans law verification)
5	To determine resistance per unit length and specific resistance of a given resistance using Carey Foster's Bridge.	https://vlab.amrita.edu/?sub=1&brch=192&sim=346&cnt=1	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/carey-foster-bridge-iitk/simulation.html
6	To study the resonance condition of a series LCR circuit.	https://vlab.amrita.edu/?sub=1&brch=75&sim=330&cnt=1	
7	To determine the electrochemical equivalent (ECE) of copper.	http://learnphysics-dhruv.blogspot.com/2015/03/copper-voltameter-to-determine-electro.html	https://youtu.be/drV2nbDjR1k (ECE of Copper experiment)
8	To calibrate the given ammeter and voltmeter by potentiometer.		
9	To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.	-	
10	To measure high resistance by leakage method	http://vlabs.iitb.ac.in/vlabs-dev/labs/physics-basics/labs/carey-foster-bridge-iitk/simulation.html	

Revised Structure B. Tech 1st Year

Reference Books
1. Practical Physics- K. K. Dey & B. N. Dutta (Kalyani Publishers New Delhi)
2. Engineering Physics-Theory and Practical- Katiyar & Pandey (Wiley India)
3. Engineering Physics Practical- S K Gupta (KrishnaPrakashan Meerut)

Course Outcomes:
1. To determine the wavelength of sodium light by Newton"s ring experiment
2. To determine the wavelength of sodium light with the help of Fresnel"s bi-prism
3. To determine the variation of magnetic field with the distance along the axis of a current carrying coil and estimate the radius of the coil.
4. To draw hysteresis (B-H curve) of a specimen in the form of a transformer and to determine its hysteresis loss.

Revised Structure B. Tech 1st Year

KAS-152P KAS-252P	CHEMISTRY LAB	0L:0T:2P	1 Credit

SUGGESTIVE LIST OF EXPERIMENTS:

LIST OF EXPERIMENTS

1. Determination of alkalinity in the given water sample.
2. Determination of temporary and permanent hardness in water sample using EDTA.
3. Determination of iron content in the given solution by Mohr's method.
4. Determination of viscosity of given liquid.
5. Determination of surface tension of given liquid.
6. Determination of chloride content in water sample.
7. Determination of available chlorine in bleaching powder.
8. Determination of pH by pH-metric titration.
9. Preparation of Phenol-formaldehyde and Urea-formaldehyde resin.
10. Determination of Cell constant and conductance of a solution.
11. Determination of rate constant of hydrolysis of esters.
12. Verification of Beer's law.

List of Experiments: Any ten experiments with virtual link

SN	Lab Practical	Virtual Lab Link
1	Determination of alkalinity in the given water sample.	https://vlab.amrita.edu/?sub=2&brch=193&sim=1548&cnt=1
2	Determination of temporary and permanent hardness in water sample using EDTA.	http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/Environmental_Engineering_1/labs/determination-of-hardness-nitk/simulation.html
3	Determination of iron content in the given solution by Mohr's method.	https://vlab.amrita.edu/?sub=2&brch=193&sim=352&cnt=1
4	Determination of viscosity of given liquid.	http://vlab.amrita.edu/?sub=3&brch=190&sim=339&cnt=1
5	Determination of surface tension of given liquid.	https://amrita.olabs.edu.in/?sub=1&brch=5&sim=224&cnt=7
6	Determination of chloride content in water sample.	http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/Environmental_Engineering_1/labs/determination-of-hardness-nitk/index.html

7	Determination of available chlorine in bleaching powder.	E bootathon 04
8	Determination of pH by pH-metric titration.	https://vlab.amrita.edu/?sub=2&brch=193&sim=352&cnt=1
9	Preparation of Phenol-formaldehyde and Urea-formaldehyde resin.	E bootathon 01.
10	Determination of Cell constant and conductance of a solution.	http://vlab.amrita.edu/?sub=3&brch=193&sim=575&cnt=1
11	Determination of rate constant of hydrolysis of esters.	E bootathon 04
12	Verification of Beer's law.	http://vlab.amrita.edu/?sub=3&brch=206&sim=569&cnt=975

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Use of different analytical instruments.
2. Measure molecular/system properties such as surface tension, viscosity,
3. Measure conductance of solution, chloride and iron content in water, hardness of water.
4. Estimate the rate constant of reaction.

KEE-101T KEE-201T	ELECTRICAL ENGINEERING	3L:0T:0P	3 Credits

Unit	Topics	Lectures
I	**DC Circuits :** Electrical circuit elements (R, L and C), Concept of active and passive elements, voltage and current sources, concept of linearity and linear network, unilateral and bilateral elements, Kirchhoff's laws, Loop and nodal methods of analysis, Star-delta transformation, Superposition theorem, Thevenin theorem, Norton theorem.	8
II	**Steady- State Analysis of Single Phase AC Circuits:** Representation of Sinusoidal waveforms – Average and effective values, Form and peak factors, Concept of phasors, phasor representation of sinusoidal varying voltage and current. Analysis of single phase AC Circuits consisting of R, L, C, RL, RC, RLC combinations (Series and Parallel), Apparent, active & reactive power, Power factor, power factor improvement. Concept of Resonance in series & parallel circuits, bandwidth and quality factor. Three phase balanced circuits, voltage and current relations in star and delta connections.	8
III	**Transformers:** Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.	8
IV	**Electrical machines: DC machines:** Principle & Construction, Types, EMF equation of generator and torque equation of motor, applications of DC motors (simple numerical problems) **Three Phase Induction Motor:** Principle & Construction, Types, Slip-torque characteristics, Applications (Numerical problems related to slip only) **Single Phase Induction motor:** Principle of operation and introduction to methods of starting, applications. **Three Phase Synchronous Machines:** Principle of operation of alternator and synchronous motor and their applications.	8
V	**Electrical Installations:** Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Importance of earthing. Types of Batteries, Important characteristics for Batteries. Elementary calculations for energy consumption and savings, battery backup.	8

Text Book:

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", McGraw Hill.
2. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill.
3. Ritu Sahdev, "Basic Electrical Engineering", Khanna Publishing House.
4. S. Singh, P.V. Prasad, "Electrical Engineering: Concepts and Applications" Cengage

Reference Books:

1. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press.
3. V. D. Toro, "Electrical Engineering Fundamentals", Pearson India.

Spoken Tutorial (MOOCs): Open Source Spice circuit Simulator Software

1. AC DC Circuit Analysis using NgSpice, Open Source Spice circuit Simulator Software (http://spoken- tutorial.org)

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Apply the concepts of KVL/KCL and network theorems in solving DC circuits.

2. Analyze the steady state behavior of single phase and three phase AC electrical circuits.

3. Identify the application areas of a single phase two winding transformer as well as an auto transformer and calculate their efficiency. Also identify the connections of a three phase transformer.

4. Illustrate the working principles of induction motor, synchronous machine as well as DC machine and employ them in different area of applications.

5. Describe the components of low voltage electrical installations and perform elementary calculations for energy consumption.

KEC-101T KEC-201T	EMERGING DOMAIN IN ELECTRONICS ENGINEERING	3L:0T:0P	3 Credits

Unit	Topics	Lectures
I	**Semiconductor Diode**: Depletion layer, V-I characteristics, ideal and practical Diodes, Diode Equivalent Circuits, Zener Diodes breakdown mechanism (Zener and avalanche)	3
	Diode Application: Diode Configuration, Half and Full Wave rectification, Clippers, Clampers, Zener diode as shunt regulator, Voltage-Multiplier Circuits	3
	Special Purpose two terminal Devices: Light-Emitting Diodes, Photo Diodes, Varactor Diodes, Tunnel Diodes, Liquid-Crystal Displays.	2
II	**Bipolar Junction Transistor:** Transistor Construction, Operation, Amplification action. Common Base, Common Emitter, Common Collector Configuration	4
	Field Effect Transistor: Construction and Characteristic of JFETs. Transfer Characteristic. MOSFET (MOS) (Depletion and Enhancement) Type, Transfer Characteristic.	4
III	**Operational Amplifiers:** Introduction, Op-Amp Basic, Practical Op-Amp Circuits (Inverting Amplifier, Non-inverting Amplifier, Unit Follower, Summing Amplifier, Integrator, Differentiator).Differential and Common-Mode Operation, Comparators.	4
	Introduction of IoT System, Components of IoT system: Microprocessor and Microcontroller, Bluetooth Technology, Wi-Fi Technology, Concept of Networking, Sensor Nodes, concept of cloud.	4
IV	**Digital Electronics:** Number system & representation. Introduction of Basic and Universal Gates, using Boolean algebra simplification of Boolean function. K Map Minimization upto 6 Variable.	6
	Introduction To IC Technology: SSI, MSI, LSI, VLSI Integrated Circuits.	2
V	**Fundamentals of Communication Engineering:** Basics of signal representation and analysis, Electromagnetic spectrum Elements of a Communication System, Need of modulation and typical applications, Fundamentals of amplitude modulation and demodulation techniques.	4
	Introduction to Data Communications: Goals and applications of Networks. **General Model of Wireless Communication: E**volution of mobile radio communication fundamentals, GPRS, GSM, CDMA. Elements of Satellite & Radar Communication,	4

Text Books:
1. Robert L. Boylestand / Louis Nashelsky "Electronic Devices and Circuit Theory", Pearson Education.
2. H S Kalsi, "Electronic Instrumentation", McGraw Publication
3. George Kennedy, "Electronic Communication Systems", McGraw Publication
4. David A. Bell, "Electronic Devices and Circuits", Oxford University Press.
5. Jacob Millman, C.C. Halkias, Staya brataJit, "Electronic Devices and Circuits", McGraw Hill
6. David A. Bell, Electronic Instrumentation and Measurements, Latest Edition, Oxford University Press India

Course Outcomes: At the end of this course students will demonstrate the ability to:
1. Understand the concept of PN Junction and devices.
2. Understand the concept of BJT, FET and MOFET.
3. Understand the concept of Operational amplifier
4. Understand the concept of measurement instrument.
5. Understand the working principle of different type of sensor and their uses.
6. Understand the concept of IoT system & Understand the component of IoT system

KCS-101T KCS-201T	PROGRAMMING FOR PROBLEM SOLVING	3L:0T:0P	3 Credits

Unit	Topics	Lectures
I	**Introduction to Programming: Introduction to components of a computer system:** Memory, processor, I/O Devices, storage, operating system, Concept of assembler, compiler, interpreter, loader and linker. **Idea of Algorithm:** Representation of Algorithm, Flowchart, Pseudo code with examples, From algorithms to programs, source code. **Programming Basics:** Structure of C program: writing and executing the first C program, Syntax and logical errors in compilation, object and executable code. Components of C language: Standard I/O in C, Fundamental data types, Variables and memory locations, Storage classes.	8
II	**Arithmetic expressions & Conditional Branching: Arithmetic expressions and precedence:** Operators and expression using numeric and relational operators, mixed operands, type conversion, logical operators, bit operations, assignment operator, operator precedence and associatively. **Conditional Branching:** Applying if and switch statements, nesting if and else, use of break and default with switch.	8
III	**Loops & Functions: Iteration and loops:** use of while, do while and for loops, multiple loop variables, use of break and continue statements. **Functions:** Introduction, types of functions, functions with array, passing parameters to functions, call by value, call by reference, recursive functions.	8
IV	**Arrays & Basic Algorithms: Arrays:** Array notation and representation, manipulating array elements, using multi dimensional arrays. Character arrays and strings, Structure, union, enumerated data types, Array of structures, Passing arrays to functions. **Basic Algorithms:** Searching &Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, Notion of order of complexity.	8
V	**Pointer& File Handling: Pointers:** Introduction, declaration, applications, Introduction to dynamic memory allocation (malloc, calloc, realloc, free), Use of pointers in self-referential structures, notion of linked list (no implementation) **File handling:** File I/O functions, Standard C preprocessors, defining and calling macros, command-line arguments.	8

Text Books:
1. Schum"s Outline of Programming with C by Byron Gottfried, McGraw-Hill
2. The C programming by Kernighan Brain W. and Ritchie Dennis M., Pearson Education.
3. Computer Basics and C Programming by V.Rajaraman , PHI Learning Pvt. Limited, 2015.
4. Computer Concepts and Programming in C, R.S. Salaria, Khanna Publishing House
5. Computer Concepts and Programming in C, E Balaguruswami, McGraw Hill
6. Computer Science- A Structured Programming Approach Using C, by Behrouz A. Forouzan, Richard F. Gilberg, Thomson, Third Edition , Cengage Learning - 2007.

7. Let Us C By Yashwant P. Kanetkar.
8. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, 2006.
9. Programming in C by Kochan Stephen G. Pearson Education – 2015.
10. Computer Concepts and Programming in C by D.S. Yadav and Rajeev Khanna, New Age International Publication.
11. Computer Concepts and Programming by Anami, Angadi and Manvi, PHI Publication.
12. Computer Concepts and Programming in C by Vikas Gupta, Wiley India Publication
13. Computer Fundamentals and Programming in C. Reema Thareja, Oxford Publication
14. Problem Solving and Programming in C, R.S. Salaria, Khanna Publishing House.

Course Outcomes: At the end of this course students will be able to:

1. To develop simple algorithms for arithmetic and logical problems.
2. To translate the algorithms to programs & execution (in C language).
3. To implement conditional branching, iteration and recursion.
4. To decompose a problem into functions and synthesize a complete program using divide and conquer approach.
5. To use arrays, pointers and structures to develop algorithms and programs.

KME-101T KME-201T	FUNDAMENTAL OF MECHANICAL ENGINEERING AND MECHATRONICS	3L:0T:0P	3 Credits

Unit	Topics	Lectures
I	**Unit I: Introduction to Mechanics of Solid:** Normal and shear Stress, strain, Hookes' law, Poisson's ratio, elastic constants and their relationship, stress-strain diagram for ductile and brittle materials, factor of safety. Basic Numerical problems. Types of beams under various loads, Statically Determinate Beams, Shear force and bending moment in beams, Shear force and bending moment diagrams, Relationships between load, shear and bending moment. Basic Numerical problems.	8
II	**Introduction to IC Engines and RAC:** **IC Engine:** Basic Components, Construction and Working of Two stroke and four stroke SI & CI engine, merits and demerits, scavenging process; Introduction to electric, and hybrid electric vehicles. **Refrigeration:** Its meaning and application, unit of refrigeration; Coefficient of performance, methods of refrigeration, construction and working of domestic refrigerator, concept of heat pump. Formula based numerical problems on cooling load. **Air-Conditioning:** Its meaning and application, humidity, dry bulb, wet bulb, and dew point temperatures, comfort conditions, construction and working of window air conditioner.	10
III	**Introduction to Fluid Mechanics and Applications:** **Introduction:** Introduction: Fluids properties, pressure, density, dynamic and kinematic viscosity, specific gravity, Newtonian and Non-Newtonian fluid, Pascal's Law, Continuity Equation, Bernaulli's Equation and its applications, Basic Numerical problems. Working principles of hydraulic turbines & pumps and their classifications, hydraulic accumulators, hydraulic lift and their applications.	7
IV	**Measurements and Control System:** Concept of Measurement, Error in measurements, Calibration, measurements of pressure, temperature, mass flow rate, strain, force and torques; Concept of accuracy, precision and resolution, Basic Numerical problems. System of Geometric Limit, Fit, Tolerance and gauges, Basic Numerical problems. **Control System Concepts:** Introduction to Control Systems, Elements of control system, Basic of open and closed loop control with example.	8
V	**Introduction to Mechatronics:** Evolution, Scope, Advantages and disadvantages of Mechatronics, Industrial applications of Mechatronics, Introduction to autotronics, bionics, and avionics and their applications. Sensors and Transducers: Types of sensors, types of transducers and their characteristics. **Overview of Mechanical Actuation System** – Kinematic Chains, Cam, Train Ratchet Mechanism, Gears and its type, Belt, Bearing, **Hydraulic and Pneumatic Actuation Systems:** Overview: Pressure Control Valves, Cylinders, Direction Control Valves, Rotary Actuators, Accumulators, Amplifiers, and Pneumatic Sequencing Problems.	10

Reference Books:
1. Basic Mechanical Engineering, G Shanmugam, S Ravindran, McGraw Hill
2. Basic Mechanical Engineering, M P Poonia and S C Sharma, Khanna Publishers
3. Mechatronics : Principles, Concepts and Applications, Nitaigour Mahalik, McGraw Hill
4. Mechatronics, As per AICTE: Integrated Mechanical Electronic Systems, K.P. Ramachandran, G.K. Vijayaraghavan, M.S.Balasundaram, Wiley India
5. Mechanical Measurements & Control, Dr. D. S. Kumar. Metropolitan Book Company
6. Fluid Mechanics and Hydraulic Machines, Mahesh Kumar, Pearson India

The students will be able to		Blooms Taxonomy
CO1	Understand the concept of stress and strain, factor of safety, beams	K2
CO2	Understand the basic component and working of internal combustion engines, electric and hybrid vehicles, refrigerator and heat pump, air-conditioning.	K2
CO3	Understand fluid properties, conservation laws, hydraulic machinery used in real life.	K2
CO4	Understand the working principle of different measuring instrument with the knowledge of accuracy, error and calibration, limit, fit, tolerance and control system.	K2
CO5	Understand concept of mechatronics with their advantages, scope and Industrial application, the different types of mechanical actuation system, the different types of hydraulic and pneumatic systems.	K2
CO6	Apply concepts of strength of material for safe design, refrigeration for calculation of COP, concepts of fluid mechanics in real life, concepts of measurements in production systems.	K3

KCE-151P KCE-151P	ENGINEERING GRAPHICS AND DESIGN LAB	0L:1T:2P	1 Credits

Unit	Topics	Lectures
I	**Introduction to Engineering Drawing, Orthographic Projections:** Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Scales –Plain and Diagonal Scales. Principles of Orthographic Projections – Conventions – Projections of Points and Lines inclined to both planes; Projections of planes inclined Planes – Auxiliary Planes	8
II	**Projections and Sections of Regular Solids:** Sections in lined to both the Planes – Auxiliary Views; Simple annotation, dimensioning and scale. Floor plans the include: windows, doors and fixtures such as WC, Both, sink, shower, etc. Prism, Cylinder, Pyramid, Cone–Auxiliary Vies: Development of surfaces of Right Regular Solids – Prism, Pyramid, Cylinder and Cone.	8
III	**Isometric Projections:** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice- versa, Conversions.	8
IV	**Computer Graphics:** Listing the computer technologies the impact on graphical communication, Demonstration knowledge of the theory of CAD software [such as: The Menu System, Tollbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects: Isometric Views of lines, Planes, Simple and compound Solids]; Set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles; Applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to pater using the print command: orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modelling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two- dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, Multiview, auxiliary, and section views. Spatial visualization exercises Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling.	8
V	**Demonstration of a simple team design project:** Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modelling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling; Introduction to Building Information Modelling (BIM).	8

Text Books:
1. Bhatt N.D., Panchal V.M. & Ingle P.R. (2014), Engineering Drawing, Charotar Publishing House.
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C.M. (2012), Engineering Graphics, McGraw Publication
4. Engineering Graphics & Design, A.P. Gautam & Pradeep Jain, Khanna Publishing House
5. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers. (Corresponding set of) CAD Software Theory and User Manuals.

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Understanding of the visual aspects of engineering design
2. Understanding of engineering graphics standards and solid modelling
3. Effective communication through graphics
4. Applying modern engineering tools necessary for engineering practice
5. Appling computer-aided geometric design
6. Analysis of Isometric views
7. Creating working drawings

KWS-151P KWS-251P	MECHANICAL WORKSHOP LAB	0L:1T:2P	1 Credit

SUGGESTIVE LIST OF EXPERIMENTS:

	The students will be able to	Blooms Taxonomy
CO1	Use various engineering materials, tools, machines and measuring equipments.	K3
CO2	Perform machine operations in lathe and CNC machine.	K3
CO3	Perform manufacturing operations on components in fitting and carpentry shop.	K3
CO4	Perform operations in welding, moulding, casting and gas cutting.	K3
CO5	Fabricate a job by 3D printing manufacturing technique	K3

S. No.	Mechanical Workshop	Duration
1	**Introduction to Mechanical workshop material, tools and machines**	
	To study layout, safety measures and different engineering materials (mild steel, medium carbon steel, high carbon steel, high speed steel and cast iron etc) used in workshop. To study and use of different types of tools, equipments, devices & machines used in fitting, sheet metal and welding section. To determine the least count of vernier caliper, vernier height gauge, micrometer (Screw gauge) and take different reading over given metallic pieces using these instruments.	3 Hours
2	**Machine shop**	
	Demonstration of working, construction and accessories for Lathe machine	3 Hours
	Perform operations on Lathe - Facing, Plane Turning, step turning, taper turning, threading, knurling and parting.	
3	**Fitting shop**	
	1. Practice marking operations. 2. Preparation of U or V -Shape Male Female Work piece which contains: Filing, Sawing, Drilling, Grinding.	3 Hours
4	**Carpentry Shop**	
	Study of Carpentry Tools, Equipment and different joints.	
	Making of Cross Half lap joint, Half lap Dovetail joint and Mortise Tenon Joint	3 Hours
5	**Welding Shop**	
	Introduction to BI standards and reading of welding drawings.	

	Practice of Making following operations Butt Joint Lap Joint TIG Welding MIG Welding	6 Hours
6	**Moulding and Casting Shop**	
	Introduction to Patterns, pattern allowances, ingredients of moulding sand and melting furnaces. Foundry tools and their purposes Demo of mould preparation and Aluminum casting Practice – Study and Preparation of Plastic mould	6 Hours
7	**CNC Shop**	
	Study of main features and working parts of CNC machine and accessories that can be used. Perform different operations on metal components using any CNC machines	6 Hours
8	**To prepare a product using 3D printing**	3 Hours

Reference Books:
1. Workshop Practice, H S Bawa, McGraw Hill
2. Mechanical Workshop Practice, K C John, PHI
3. Workshop Practice Vol 1, and Vol 2, by HazraChoudhary , Media promoters and Publications
4. CNC Fundamentals and Programming, By P. M. Agrawal, V. J. Patel, Charotar Publication.

KAS- 154P KAS-254P	ENGLISH LAB	0L:1T:2P	1 Credit

Course Objectives:
1. To facilitate software based learning to provide the required English Language proficiency to students.
2. To acquaint students with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
3. To train students to use the correct and error-free writing by being well versed in rules of English grammar.
4. To cultivate relevant technical style of communication and presentation at their work place and also for academic uses.
5. To enable students to apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics.

SYLLABUS: PROFESSIONAL COMMUNICATION LAB SHALL HAVE TWO PARTS:

Interactive and Communicative Practical with emphasis on Oral Presentation/Spoken Communication based on International Phonetic Alphabets (LP.A.)

LIST OF PRACTICALS

1. Group Discussion: Practical based on Accurate and Current Grammatical Patterns.
2. Conversational Skills for Interviews under suitable Professional Communication Lab conditions with emphasis on Kinesics.
3. Communication Skills for Seminars/Conferences/Workshops with emphasis on Paralinguistic /Kinesics.
4. Presentation Skills for Technical Paper/Project Reports/ Professional Reports based on proper Stress and Intonation Mechanics
5. Official/Public Speaking based on suitable Rhythmic Patterns.
6. Theme Presentation/ Keynote Presentation based on correct methodologies argumentation
7. Individual Speech Delivery/Conferencing with skills to defend Interjections/Quizzes.
8. Argumentative Skills/Role Play Presentation with Stress and Intonation.
9. Comprehension Skills based on Reading and Listening Practical's on a model Audio

1. **Computer assisted software based Language Learning:** Software based self-guided learning to provide the required English language proficiency to students from an employability and career readiness standpoint. The software should align to Common European Framework of Reference for Languages (CEFR) and deliver a CEFR level – B2 upon completion.
2. **Interactive Communication Skills:** Students should practice the language with variety of activities and exercises based on employability skills as startup presentations, GD, Mock interview, Video portfolio, Extempore, Role play, Just A Minute (JAM) etc.

Suggested software:
- *Oxford Achiever* by Oxford University Press.
- *Cambridge English Empower* by Cambridge University Press.
- *MePro.* by Pearson India Education Services Pvt. Ltd.
- *New Interactions* by McGraw-Hill India.

Reference Books:

1. Word Power Made Easy by Norman Lewis, W.R. Goyal Pub. & Distributors, 2009, Delhi.
2. Manual of Practical Communication by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
3. A Course in Phonetics and Spoken English, Sethi & Dhamija:, Prentice Hall
4. English Pronouncing Dictionary, Joans Daniel, Cambridge University Press, 2007.
5. English Grammar and Usage by R. P. Sinha, Oxford University Press, 2005, New Delhi.
6. English Grammar, Composition and Usage by N.K. Agrawal & F.T. Wood, Macmillan India Ltd., New Delhi.
7. Effective Communication Skill, Kulbhusan Kumar, RS Salaria, Khanna Publishing House
8. English Grammar & Composition by Wren & Martin, S.Chand & Co. Ltd., New Delhi.
9. Communication Skills for Engineers and Scientists, Sangeeta Sharma et.al. PHI Learning Pvt. Ltd, 2011, New Delhi.
10. Personality Development, Harold R. Wallace & L. Ann Masters, Cengage Learning, New Delhi
11. Personality Development & Soft Skills, Barun K. Mitra, Oxford University Press, 2012 New Delhi.
12. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, McGraw Hill & Co. Ltd., 2001, New Delhi.
13. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.
14. Spoken English- A Manual of Speech and Phonetics by R. K. Bansal & J.B.Harrison, Orient Blackswan, 2013, New Delhi.
15. Business English by Ken Taylor, Orient Blackswan, 2011, New Delhi.

Course outcome: At the end of this course students will demonstrate the ability:
1. Students will be enabled to understand the basic objective of the course by being acquainted with specific dimensions of communication skills i.e. Reading, Writing, Listening, Thinking and Speaking.
2. Students would be able to create substantial base by the formation of strong professional vocabulary for its application at different platforms and through numerous modes as Comprehension, reading, writing and speaking etc.
3. Students will apply it at their work place for writing purposes such as Presentation/official drafting/administrative communication and use it for document/project/report/research paper writing.
4. Students will be made to evaluate the correct and error-free writing by being well-versed in rules of English grammar and cultivate relevant technical style of communication &presentation at their work place and also for academic uses.
5. Students will apply it for practical and oral presentation purposes by being honed up in presentation skills and voice-dynamics. They will apply techniques for developing interpersonal communication skills and positive attitude leading to their professional competence.

KCS-151P KCS-251P	PROGRAMMING FOR PROBLEM SOLVING	0L:1T:2P	1 Credit

KCS151P- Programming for Problem Solving Lab		
Course Outcome (CO)	**Bloom's Knowledge Level (KL)**	
At the end of course , the student will be able to:		
CO 1	Able to implement the algorithms and draw flowcharts for solving Mathematical and Engineering problems.	K_3, K_4
CO 2	Demonstrate an understanding of computer programming language concepts.	K_3, K_2
CO 3	Ability to design and develop Computer programs, analyzes, and interprets the concept of pointers, declarations, initialization, operations on pointers and their usage.	K_6, K_4
CO 4	Able to define data types and use them in simple data processing applications also he/she must be able to use the concept of array of structures.	K_1, K_5
CO 5	Develop confidence for self education and ability for life-long learning needed for Computer language.	K_3, K_4

Lab No.	Expt.	Program
LAB 1	**1**	Write a program to calculate the area of triangle using formula at=√s(s-a)(s-b)(s-c)
	2	Basic salary of an employee is input through the keyboard. The DA is 25% of the basic salary while the HRA is 15% of the basic salary. Provident Fund is deducted at the rate of 10% of the gross salary (BS+DA+HRA). Program to calculate the Net Salary.
	3	Write a program to determine the roots of quadratic equation.
	4	Write a program to find the largest of three numbers using nested if else.
	5	Write a program to receive marks of physics, chemistry & maths from user & check its eligibility for course if a) Marks of physics > 40 b) Marks of chemistry > 50 c) Marks of math's > 60 d) Total of physics & math's marks > 150 or e) Total of three subjects marks > 200
LAB 2	**6**	Write a program to find the value of y for a particular value of n. The a, x, b, n is input by user if n=1 y=ax%b if n=2 y=ax2+b2 if n=3 y=a-bx if n=4 y=a+x/b

	7	Write a program to construct a Fibonacci series upto n terms.
	8	Write a program to find whether the number is Armstrong number.
	9	Write a program to generate sum of series 1!+2!+3!+--------------n!
	10	Write a program to find the sum of following series 1-X1/1!+X2/2!-............Xn/n!.
LAB 3	11	Write a program to print the entire prime no between 1 and 300.
	12	Write a program to print out all the Armstrong number between 100 and 500.

	13	Write a program to draw the following figure:
		3 2 1
		21
		1
		
		    *
		   **
		  ***

	14	Write a program to receive a five-digit no and display as like 24689: 2 4 6 8 9
LAB 4	15	Write a function that return sum of all the odd digits of a given positive no entered through keyboard.
	16	Write a program to print area of rectangle using function & return its value to main function.
	17	Write a program to calculate the factorial for given number using function.
	18	Write a program to find sum of Fibonacci series using function.
	19	Write factorial function & use the function to find the sum of series S=1!+2!+-----n!.
LAB 5	20	Write a program to find the factorial of given number using recursion.
	21	Write a program to find the sum of digits of a 5 digit number using recursion.
	22	Write a program to calculate the GCD of given numbers using recursion.
	23	Write a program to convert decimal number in to binary number.
	24	Write a program to convert binary number in to decimal number.
LAB 6	25	Write a program to delete duplicate element in a list of 10 elements & display it on screen.
	26	Write a program to merge two sorted array & no element is repeated during merging.
	27	Write a program to evaluate the addition of diagonal elements of two square matrixes.
	28	Write a program to find the transpose of a given matrix & check whether it is symmetric or not.
	29	Write a program to print the multiplication of two N*N (Square) matrix.
LAB 7	30	Write a program in C to check whether the given string is a palindrome or

		not.
	31	Write program to sort the array of character (String) in alphabetical order like STRING in GINRST.
	32	Write a program to remove all the blank space from the string & print it, also count the no of characters.
	33	Write a program to store the following string "zero", "one" -------"five". Print the no in words, given in figure as 3205.
LAB 8	**34**	Write a program to compare two given dates. To store a date uses a structure that contains three members namely day, month and year. If the dates are equal then display message equal otherwise unequal.
	35	Define a structure that can describe a hotel. It should have the member that includes the name, address, grade, room charge and number of rooms. Write a function to print out hotel of given grade in order of room charges.
	36	Define a structure called cricket with player name, team name, batting average, for 50 players & 5 teams. Print team wise list contains names of player with their batting average.
LAB 9	**37**	Write a c program to copy & count the character content of one file says a.txt to another file b.txt.
	38	Write a program to take 10 integers from file and write square of these integer in other file.
	39	Write a program to read number from file and then write all 'odd' number to file ODD.txt & all even to file EVEN.txt.
	40	Write a program to print all the prime number, between 1 to 100 in file prime.txt.
	41	Write the following C program using pointer: a) To sort the list of numbers through pointer b) To reverse the string through pointer.
LAB 10	**42**	Write a program to find the largest no among 20 integers array using dynamic memory allocation.
	43	Using Dynamic Memory Allocation, Write a program to find the transpose of given matrix.
	44	Write a program to find the factorial of given number using command line argument.
	45	Write a program to find the sum of digits of a 5 digit number using command line argument.

Note:
  a) **The Instructor may add/delete/modify/tune experiments, wherever he/she feels in a justified manner**
  b) **It is also suggested that open source tools should be preferred to conduct the lab. Some open source online compiler to conduct the C lab are as follows:**

  ❖ **https://www.jdoodle.com/c-online-compiler/**
  ❖ **https://www.tutorialspoint.com/compile_c_online.php**
  ❖ **https://www.programiz.com/c-programming/online-compiler/**
  ❖ **https://www.hackerrank.com/**

KCS151P- Programming for Problem Solving Lab: Mapping with Virtual Lab

Name of the Lab	Name of the Experiment
Problem Solving Lab	Numerical Representation
	Beauty of Numbers
	More on Numbers
	Factorials
	String Operations
	Recursion
	Advanced Arithmatic
	Searching and Sorting
	Permutation
	Sequences

KEE-151P KEE-251P	ELECTRICAL ENGINEERING LAB	0L:0T:2P	1 Credit

SUGGESTIVE LIST OF EXPERIMENTS:

(A) Hardware based experiments

1. Verification of Kirchhoff"s laws.
2. Verification of Superposition and Thevenin Theorem.
3. Measurement of power and power factor in a single phase ac series inductive circuit and study improvement of power factor using capacitor
4. Study of phenomenon of resonance in RLC series circuit and obtain resonant frequency.
5. Connection and measurement of power consumption of a fluorescent lamp (tube light).
6. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
7. Determination of parameters of ac single phase series RLC circuit.
8. To observe the B-H loop of a ferromagnetic material in CRO.
9. Determination of (i) Voltage ratio (ii) polarity and (iii) efficiency by load test of a single phase transformer.
10. Determination of efficiency of a dc shunt motor by load test.
11. To study running and speed reversal of a three phase induction motor and record speed in both directions.
12. Demonstration of cut-out sections of machines: dc machine, three phase induction machine, single phase induction machine and synchronous machine.

(B) Experiments available on virtual lab

1. Kirchhoff"s laws.
   Virtual lab link: http://vlab.amrita.edu/?sub=3&brch=75&sim=217&cnt=2
2. Thevenin Theorem.
   Virtual lab link: https://vlab.amrita.edu/?sub=1&brch=75&sim=313&cnt=1
3. RLC series resonance.
   Virtual lab link: https://vlab.amrita.edu/?sub=1&brch=75&sim=330&cnt=1
4. Measurement of power in 3- phase circuit by two wattmeter method and determination of its power factor for star as well as delta connected load.
   Virtual lab link: http://vp-dei.vlabs.ac.in/Dreamweaver/measurement.html
5. Determination of parameters of ac single phase series RLC circuit.
   Virtual lab link: https://vlab.amrita.edu/?sub=1&brch=75&sim=332&cnt=1
6. To observe the B-H loop of a ferromagnetic material in CRO.
   Virtual lab link: https://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=2
7. Determination of the efficiency of a dc motor by loss summation method(Swinburne's test).
   Virtual lab link: http://em-iitr.vlabs.ac.in/exp5/index.php?section=Theory

Course Outcomes: At the end of this course students will demonstrate the ability to:

1. Conduct experiments illustrating the application of KVL/KCL and network theorems to DC electrical circuits.
2. Demonstrate the behavior of AC circuits connected to single phase AC supply and measure power in single phase as well as three phase electrical circuits.
3. Perform experiment illustrating BH curve of magnetic materials.
4. Calculate efficiency of a single phase transformer and DC machine.
5. Perform experiments on speed measurement and reversal of direction of three phase induction motor and Identify the type of DC and AC machines based on their construction.

KEC-151P KEC-251P	ELECTRONICS LAB	0L:0T:2P	1 Credit

SUGGESTIVE LIST OF EXPERIMENTS:

Part A

1. Study of various types of Active & Passive Components based on their ratings.
2. Identification of various types of Printed Circuit Boards (PCB) and soldering Techniques.
3. PCB Lab: a. Artwork & printing of a simple PCB. b. Etching & drilling of PCB
4. Winding shop: Step down transformer winding of less than 5VA.
5. Soldering shop: Soldering and disordering of Resistor in PCB. Soldering and disordering of IC in PCB. Soldering and disordering of Capacitor in PCB

Part B

1. Study of Lab Equipments and Components: CRO, Multimeter, and Function Generator, Power supply- Active, Passive Components and Bread Board.
2. P-N Junction diode: Characteristics of PN Junction diode - Static and dynamic resistance measurement from graph.
3. Applications of PN Junction diode: Half & Full wave rectifier- Measurement of Vrms, Vdc, and ripple factor.
4. Characteristics of Zener diode: V-I characteristics of zener diode, Graphical measurement of forward and reverse resistance.
5. Characteristic of BJT: BJT in CE configuration.
6. To study Operational Amplifier as Adder and Subtractor
7. Verification of Truth Table of Various Logic Gate.
8. Implementation of the given Boolean function using logic gates in both SOP and POS forms.

(C)

Part A	**PCB Lab**: a. Artwork & printing of a simple PCB. b. Etching & drilling of PCB	This practical is not possible by virtual lab. It will be conducted only in physical mode
Part B	Study of Lab Equipment's and Components: CRO, Multimeter, Function Generator, Power supply- Active, Passive Components and Bread Board.	NA, These test equipment can be Demonstrated on line from any lab of ECE department or physical mode is only option.

(D) Experiments available on virtual lab

P-N Junction on diode: Characteristics of PN Junction diode - Static and dynamic resistance measurement from graph.	http://vlabs.iitkgp.ernet.in/be/exp5/index.html
Applications of PN Junction diode: Half & Full wave rectifier- Measurement of Vrms, Vdc, and ripple factor.	http://vlabs.iitkgp.ernet.in/be/exp6/index.html http://vlabs.iitkgp.ernet.in/be/exp7/index.html
Characteristics of Zener diode: V-I characteristics of Zener diode, Graphical measurement of forward and reverse resistance.	http://vlabs.iitkgp.ernet.in/be/exp10/index.html
Characteristic of BJT: BJT in CE configuration.	http://vlabs.iitkgp.ernet.in/be/exp11/index.html
To study Operational Amplifier as Adder and Subtractor	http://vlabs.iitkgp.ernet.in/be/exp17/index.html http://vlabs.iitkgp.ernet.in/be/exp18/index.html
Verification of Truth Table of Various Logic Gate	https://de-iitr.vlabs.ac.in/digital-electronics-iitr/exp/truth-table-gates/
Implementation of the given Boolean function using logic gates in both SOP and POS forms.	https://de-iitr.vlabs.ac.in/digital-electronics-iitr/exp/realization-of-logic-functions/

KMC 101/201	ARTIFICAL INTELLIGENCE FOR ENGINEERS	2L:0T:0P	2 Credit

The students will be able to		Blooms Taxonomy
CO1	Understand the evolution and various approaches of AI	K2
CO2	Understand data storage, processing, visualization, and its use in regression, clustering etc.	K2
CO3	Understand natural language processing and chatbots	K2
CO4	Understand the concepts of neural networks	K2
CO5	Understand the concepts of face, object, speech recognition and robots	K2

Course	Topics
Unit 1	**An overview to AI**
1.1	The evolution of AI to the present
1.2	Various approaches to AI
1.3	What should all engineers know about AI?
1.4	Other emerging technologies
1.5	AI and ethical concerns
Unit 2	**Data & Algorithms**
2.1	History Of Data
2.2	Data Storage And Importance of Data and its Acquisition
2.3	The Stages of data processing
2.4	Data Visualization
2.5	Regression, Prediction & Classification
2.6	Clustering & Recommender Systems
Unit 3	**Natural Language Processing**
3.1	Speech recognition
3.2	Natural language understanding
3.3	Natural language generation
3.4	Chatbots
3.5	Machine Translation
Unit 4	**Artificial Neural Networks**
4.1	Deep Learning
4.2	Recurrent Neural Networks
4.3	Convolutional Neural Networks
4.4	The Universal Approximation Theorem
4.5	Generative Adversarial Networks
Unit 5	**Applications**
5.1	Image and face recognition
5.2	Object recognition
5.3	Speech Recognition besides Computer Vision
5.4	Robots
5.5	Applications

Reference Books:

1. Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig, Prentice Hall

2. Artificial Intelligence by Kevin Knight, Elaine Rich, Shivashankar B. Nair, Publisher : McGraw Hill

3. Data Mining: Concepts and Techniques by Jiawei Han, Micheline Kamber, Jian Pei, Publisher: Elsevier Science.

4. Speech & Language Processing by Dan Jurafsky, Publisher : Pearson Education

5. Neural Networks and Deep Learning A Textbook by Charu C. Aggarwal, Publisher: Springer International Publishing

6. Introduction to Artificial Intelligence By Rajendra Akerkar, Publisher : PHI Learning

KMC102/202	EMERGING TECHNOLOGY FOR ENGINEERING	2L:0T:0P	2 Credit

Course Objectives:
1. To understand the basic concepts of IoT, followed by major components, its layer architecture and how IoT is impacting the Industry in the various forms along with major applications.
2. To make students aware about basic concepts of cloud computing, its benefits and different applications along with insights of major service providers.
3. To understand the basic concepts of Blockchain and its underlying technologies with its implementation as cryptocurrencies.
4. To understand the concept of Additive Manufacturing, its applications in various fields and the basic concepts of drones, their assembly and government regulations involved.
5. To introduce students to the upcoming technology and to develop the required skills for practical applications.

The students will be able to		Blooms Taxonomy
CO1	Understand the concepts of internet of things, smart cities and industrial internet of things	K2
CO2	Understand the concepts of cloud computing	K2
CO3	Understand the concepts of block chain, cryptocurrencies, smart contracts	K2
CO4	Understand design principles, tools, trends in 3 D printing and drones	K2
CO5	Understand augmented reality (AR), virtual reality (VR), 5G technology, brain computer interface and human brain	K2

Course	EMERGING TECHNOLOGY FOR ENGINEERING
Unit 1	**Internet of Things**
1.1	What is the Internet of Things?
1.2	Sensors, their types and features
1.3	IoT components: layers
1.4	Smart Cities
1.5	Industrial Internet of Things
Unit 2	**Cloud Computing**
2.1	Cloud Computing : it's nature and benefits
2.2	AWS
2.3	Google
2.4	Microsoft
2.5	Vendor Offering - IBM
Unit 3	**Blockchain**
3.1	What is Blockchain? Fundamentals
3.2	Principles and Technologies
3.3	Cryptocurrencies
3.4	Smart Contracts
3.5	Blockchain Applications and use cases

Unit 4	Digital Manufacturing : 3D Printing & Drones
4.1	The history and survey of 3D Printing
4.2	Design Principles and Tools
4.3	Emerging Trends & Use Cases in 3D Printing
4.4	Introduction of Drones, Engineering Disciplines
4.5	Multirotor Drone Assembly Course /Regulations and procedures for becoming a drone pilot
Unit 5	Future Trends
5.1	Augmented Reality (AR) and Virtual Reality (VR)
5.2	History, objective & global scenario of 5G Telecom
5.3	5G in India, Application and Use Cases
5.4	Brain Computer Interface, Application, Modal and Global Market
5.5	Brain Computer Interface and Human Brain

References Books:

IoT:
1. Internet of Things(IoT): Systems and Applications: Mehmet R. Yuce, Jamil Y. Khan
2. IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things: David Hanes, Patrick Grossetete, Gonzalo Salgueiro.
3. Designing the Internet of Things: McEwen, Adrian, Cassimally, Hakim.

Cloud Computing:
1. Mastering Cloud Computing: Foundations and Applications Programming Book by Christian Vecchiola, Rajkumar Buyya, and S. Thamarai Selvi
2. Cloud Computing – Concepts, Technology and Architecture Pearson Thomas Erl
3. Cloud Computing Master the Concepts, Architecture and Applications with Real-world examples and Case studies By Ruchi Doshi, Temitayo Fagbola, Mehul Mahrishi.

Blockchain:
1. Block Chain: Blueprint for a New Economy, O'Reilly, Melanie Swan
2. Blockchain Basics: A Non-Technical Introduction in 25 Steps by: Daniel Drescher.

Digital Manufacturing:
1. Designing Reality: How to Survive and Thrive in the Third Digital Revolution by Prof. Niel Gershenfeld.
2. Additive Manufacturing Technologies: 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing by Ian Gibson.
3. Build a Drone: A Step-by-Step Guide to Designing, Constructing, and Flying Your Very Own Drone by Barry Davies.

Future Trends:
1. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications: Foundations of Effective Design", Morgan Kaufmann, 2009.
2. Doug A Bowman, Ernest Kuijff, Joseph J La Viola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice", Addison Wesley, USA, 2005.
3. Simon Haykin, "Communication Systems", 4th Edition, Wiley India

KNC-101	**SOFT SKILLS-I**	**2L:0T:0P**

SOFT SKILLS-I

UNIT I- Basics of Applied Grammar and usage
Tenses: Part of Speech, Active & Passive Voice, Articles, Subject-verb agreement, Antonyms, Synonyms, Prefix and Suffix, Narration, Conditional sentences, Concord, Tag questions, punctuation marks.

UNIT II- Presentation and Interaction Skills
Speech Delivery, Interjecting: Objectives& Methodology; Group Discussion: Objectives & Methods; Theme Presentation: Methods; Argumentative skills: Pattern and Ingredients; Debate & Discussion: Unity, Coherence & Emphasis. Public Speaking: Audience Analysis: Approach and Style. Interviews: Types; Focus & Objectives.

UNIT III- Interpersonal Communication Skills
Features: Methods; Principles; Requisites; Team- work; Skills: Empathy, Emotional Intelligence, empathy and listening skills. Time Management; Attitude; Responsibility. Leadership qualities: Integrity; Values; Trust; Self-Confidence & Courage; Communication and Networking; Speed reading; Problem Solving & Trouble- Shooting

UNIT IV- Persuasion and Negotiation Skills
Definition; Understanding Attitude, Beliefs, Values and Behavior; The process of Persuasion: Analysis of Audience; Classification of Audience; Egoistic and Non-Egoistic; Specific Techniques for Specific Audience; Skills of Persuasion, Steps to Persuasion/Influence, Negotiation: Definition; Process of Negotiation: Characteristics; Qualities of good negotiator; Approaches to Negotiation.

UNIT V- Communication Skills
Introduction to oral communication, Nuances & Modes of Speech Delivery, Public speaking: confidence, clarity, and fluency, Non verbal Communication: Kinesics, Paralinguistic features of Voice-Dynamics, Proxemics, Chronemics, and Presentation Strategies: planning, preparation, organization, delivery.

Course Outcome:
Unit 1- Students will be enabled to **understand** the correct usage of grammar.
Unit 2- Students will **apply** the fundamental inputs of communication skills in making speech delivery, individual conference, and group communication.
Unit 3-Students will **evaluate** the impact of interpersonal communication on their performance as a professional and in obtaining professional excellence at the workplace.
Unit 4-Skills and techniques of persuasion and negotiation would **enhance** the level of students at multifarious administrative and managerial platforms.
Unit 5-Student will be able to **equip** with basics of communication skills and will **apply** it for practical and oral purposes by being honed up in presentation skills and voice-dynamics.

Prescribed Books:

1. **Technical Communication, (Second Ed.); O.U.P.,** Meenakshi Raman & S.Sharma New Delhi, 2011
2. **Business Communication for Managers**, Payal Mehra, Pearson, Delhi, 2012.
3. **Personality Development,** Harold R. Wallace et. al, Cengage Learning India Pvt. Ltd; New Delhi 2006
4. **Practical Communication** by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
5. **Personality Development & Soft Skills,** Barun K.Mitra, Oxford University Press, New Delhi, 2012.
6. **Public Speaking,** William S. Pfeiffer, Pearson, Delhi, 2012.
7. **Human Values,** A.N. Tripathi, New Age International Pvt. Ltd. Publishers New Delhi ,2005

KNC-201	**SOFT SKILLS-II**	**2L:0T:0P**

SOFT SKILLS-II

UNIT I- LSRW Skills

Active Listening: Meaning and Art of Listening, Pronunciation, Tongue-Twisters, Stress in English Language, Reading style: Skimming; Scanning; Churning & Assimilation, Effective writing tools, Writing: Methods: Inductive; Deductive; Exposition; Linear; Interrupted; Spatial & Chronological etc

UNIT II- Conversational& Social Skills

Definition of Conversation; Speech and Conversation: Distinction; Listening and Conversation; Sustaining Interest; Rules of Conversation; Conversation and Personality; Importance of Conversation: Competence Relationships; Social Skills: Role of Communication; Purposeful Socializing; Attributes: Effective Communication; Conflict Resolution;; Relationship Management; Respect; Improvement Techniques: Feedback; Goal Setting; Affording Resources; Adopting Interpersonal Skills; Importance.

UNIT III- Motivation Skills

Motivation: Definition; Sources of Motivation: Initiative; Willingness To Work; Eagerness to take on Work; Initiative; Learning Ability; Going Extra Miles; Learning And Analysis; Motivating Others: Techniques; One To One Correspondence; Understanding; Individual Motivation; Mobilizing Optimal Performance; Praise and Compliment; Goal Setting for Individual Employee; Individual Cultivation of Skills; Facilitating Active Involvement; Trust in the Working Hands.

UNIT IV- Work-Place Skills

Managing Stress; Techniques: Application of 4 A's; Avoid; Alter; Access; Adapt; Resilience: Flexibility in Thought and Behavior; Tolerance and Self-Belief; Team-Work and Communication; Compassion in Leadership; Communication Skills; Listening and Responding; Speaking Skills; Positive Thinking: Controlling Mind.

UNIT V- Creativity and Critical Thinking

Creativity: Definition; Characteristics of Creative Person: Fluency; Originality; Curiosity; Critical Thinking: Definition; Abilities: Discerning Facts and Claims; Credibility Analysis; Identifying Valid Reasons; Distinguishing Relevant from Irrelevant Fact/Claims; Detecting Bias; Knowing the Hidden Motives; Creative Methods; Features.

Course Outcome:

Unit 1- Students will be able to **converse** well with effective LSRW skills in English.

Unit 2- Students will **evaluate** the importance of conversation in their personal and professional domain and **apply** it for extending their professional frontiers.

Unit 3- Students will learn to **apply** motivation skills for their individual and professional excellence.

Unit 4- Students will **utilize** their teamwork and their interpersonal communication skills to survive and excel at their work-place.

Unit 5-Students will learn to **evaluate** creativity for their professional innovation and critical thinking for their competence.

Prescribed Books:

1. **Technical Communication, (Second Ed.); O.U.P.,** Meenakshi Raman &S.Sharma New Delhi, 2011
2. **Personality Development,** Harold R. Wallace et. al, Cengage Learning India Pvt. Ltd; New Delhi 2006
3. **Personality Development & Soft Skills,** Barun K. Mitra, Oxford University Press, New Delhi, 2012.
4. **Practical Communication** by L.U.B. Pandey; A.I.T.B.S. Publications India Ltd.; Krishan Nagar, 2013, Delhi.
5. **Developing Communication Skills:** by Krishna Mohan, Meera Banerji; McMillan India Ltd, Delhi,1990.
6. **Communication Skills for Engineers and Scientists:** Sangeeta Sharma et. al., THI Learning Pvt Ltd, New Delhi, 2011.
7. **Public Speaking,** William S. Pfeiffer, Pearson, Delhi, 2012.
8. **Human Values,** A.N. Tripathi, New Age International Pvt. Ltd. Publishers New Delhi ,2005.

A Guide to Induction Program

1 Introduction

(Induction Program was discussed and approved for all colleges by AICTE in March

2017. It was discussed and accepted by the Council of IITs for all IITs in August 2016. It was originally proposed by a Committee of IIT Directors and accepted at the meeting of all IIT Directors in March 2016.1 This guide has been prepared based on the Report of the Committee of IIT Directors and the experience gained through its pilot implementation in July 2016 as accepted by the Council of IITs. Purpose of this document is to help institutions in understanding the spirit of the accepted Induction Program and implementing it.)

Engineering colleges were established to train graduates well in the branch/department of admission, have a holistic outlook, and have a desire to work for national needs and beyond. The graduating student must have knowledge and skills in the area of his study. However, he must also have broad understanding of society and relationships. Character needs to be nurtured as an essential quality by which he would understand and fulfill his responsibility as an engineer, a citizen and a human being. Besides the above, several meta-skills and underlying values are needed.

There is a mad rush for engineering today, without the student determining for himself his interests and his goals. This is a major factor in the current state of demotivation towards studies that exists among UG students. The success of gaining admission into a desired institution but failure in getting the desired branch, with peer pressure generating its own problems, leads to a peer environment that is demotivating and corrosive. Start of hostel life without close parental supervision at the same time, further worsens it with also a poor daily routine.

To come out of this situation, a multi-pronged approach is needed. One will have to work closely with the newly joined students in making them feel comfortable, allow them to explore their academic interests and activities, reduce competition and make them

A Committee of IIT Directors was setup in the 152nd Meeting of IIT Directors on 6th September 2015 at IIT Patna, on how to motivate undergraduate students at IITs towards studies, and to develop verbal ability. The Committee submitted its report on 19th January 2016. It was considered at the 153rd Meeting of all IIT Directors at IIT Mandi on 26 March 2016, and the accepted report came out on 31

March 2016. The Induction Program was an important recommendation, and its pilot was implemented by three IITs, namely, IIT(BHU), IIT Mandi and IIT Patna in July 2016. At the 50th meeting of the Council of IITs on 23 August 2016, recommendation on the Induction Program and the report of its pilot implementation were discussed and the program was accepted for all IITs, work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and build character.

2. Induction Program

When new students enter an institution, they come with diverse thoughts, backgrounds and preparations. It is important to help them adjust to the new environment and inculcate in them the ethos of the institution with a sense of larger purpose. Precious little is done by most of the institutions, except for an orientation program lasting a couple of days.

We propose a 3-week long induction program for the UG students entering the institution, right at the start. Normal classes start only after the induction program is over. Its purpose is to make the students feel comfortable in their new environment, open them up, set a healthy daily routine, create bonding in the batch as well as between faculty and students, develop awareness, sensitivity and understanding of the self, people around them, society at large, and nature.2

The time during the Induction Program is also used to rectify some critical lacunas, for example, English background, for those students who have deficiency in it. The following are the activities under the induction program in which the student would be fully engaged throughout the day for the entire duration of the program.

2Induction Program as described here borrows from three programs running earlier at different institutions: (1) Foundation Program running at IIT Gandhinagar since July 2011, (2) Human Values course running at IIIT Hyderabad since July 2005, and (3) Counselling Service or mentorship running at several IITs for many decades. Contribution of each one is described next.

Counselling at some of the IITs involves setting up mentor-mentee network under which 1st year students would be divided into small groups, each assigned a senior student as a student guide, and a faculty member as a mentor. Thus, a new student gets connected to a faculty member as well as a senior student, to whom he/she could go to in case of any difficulty whether psychological, financial, academic, or otherwise.

The Induction Program defined here amalgamates all the three into an integrated whole, which leads to its high effectiveness in terms of building physical activity, creativity, bonding, and character. It develops sensitity towards self and one"s relationships, builds awareness about others and society beyond the individual, and also in bonding with their own batch-mates and a senior student besides a faculty member.

Scaling up the above amalgamation to an intake batch of 1000 plus students was done at IIT (BHU), Varanasi starting from July 2016.

2.1 Physical Activity

This would involve a daily routine of physical activity with games and sports. It would start with all students coming to the field at 6 am for light physical exercise or yoga. There would also be games in the evening or at other suitable times according to the local climate. These would help develop team work. Each student should pick one game and learn it for three weeks. There could also be gardening or other suitably designed activity where labour yields fruits from nature.

2.2 Creative Arts

Every student would choose one skill related to the arts whether visual arts or performing arts. Examples are painting, sculpture, pottery, music, dance etc. The student would pursue it every day for the duration of the program.

These would allow for creative expression. It would develop a sense of aesthetics and also enhance creativity which would, hopefully, flow into engineering design later.

2.3 Universal Human Values

It gets the student to explore oneself and allows one to experience the joy of learning, stand up to peer pressure, take decisions with courage, be aware of relationships with colleagues and supporting staff in the hostel and department, be sensitive to others, etc. Need for character building has been underlined earlier. A module in Universal Human Values provides the base.

Methodology of teaching this content is extremely important. It must not be through do"s and dont"s, but get students to explore and think by engaging them in a dialogue. It is best taught through group discussions and real life activities rather than lecturing. The role of group discussions, however, with clarity of thought of the teachers cannot be over emphasized. It is essential for giving exposure, guiding thoughts, and realizing values.

The teachers must come from all the departments rather than only one department like HSS or from outside of the Institute. Experiments in this direction at IIT (BHU) are noteworthy and one can learn from them.3

Discussions would be conducted in small groups of about 20 students with a faculty mentor each. It is to open thinking towards the self. Universal Human Values discussions could even continue for rest of the semester as a normal course, and not stop with the induction program.

Besides drawing the attention of the student to larger issues of life, it would build relationships between teachers and students which last for their entire 4-year stay and possibly beyond.

The Universal Human Values Course is a result of a long series of experiments at educational institutes starting from IIT-Delhi and IIT Kanpur in the 1980s and 1990s as an elective course, NIT Raipur in late 1990s as a compulsory one-week off campus program. The courses at IIT(BHU) which started from July 2014, are taken and developed from two compulsory courses at IIIT Hyderabad first introduced in July 2005.

2.4 Literary

Literary activity would encompass reading, writing and possibly, debating, enacting a play etc.

2.5 Proficiency Modules

This period can be used to overcome some critical lacunas that students might have, for example, English, computer familiarity etc. These should run like crash courses, so that when normal courses start after the induction program, the student has overcome the lacunas substantially. We hope that problems arising due to lack of English skills, wherein students start lagging behind or failing in several subjects, for no fault of theirs, would, hopefully, become a thing of the past.

2.6 Lectures by Eminent People

This period can be utilized for lectures by eminent people, say, once a week. It would give the students exposure to people who are socially active or in public life.

2.7 Visits to Local Area

A couple of visits to the landmarks of the city, or a hospital or orphanage could be organized. This would familiarize them with the area as well as expose them to the under privileged.

2.8 Familiarization to Dept./Branch & Innovations

The students should be told about different method of study compared to coaching that is needed at IITs. They should be told about what getting into a branch or department means what role it plays in society, through its technology. They should also be shown the laboratories, workshops & other facilities.

3 Schedule

The activities during the Induction Program would have an Initial Phase, a Regular Phase and a Closing Phase. The Initial and Closing Phases would be two days each.

3.1 Initial Phase

Time	Activity
Day 0	
Whole day	Students arrive - Hostel allotment. (Preferably do pre allotment)
Day 1	
09:00 am - 03:00 pm	Academic registration
04:30 pm - 06:00 pm	Orientation
Day 2	
09:00 am - 10:00 am	Diagnostic test (for English etc.)
10:15 am - 12:25 pm	Visit to respective Depts.
12:30 pm - 01:55 pm	Lunch
02:00 pm - 02:55 pm	Director"s Address
03:00 pm - 05:00 pm	Interaction with Parents
03:30 pm - 05:00 pm	Mentor-Mentee groups - Introduction within group. (Same as Universal Human Values groups)

3.2 Regular Phase

After two days is the start of the Regular Phase of induction. With this phase there would be regular program to be followed every day.

3.2.1 Daily Schedule

Some of the activities are on a daily basis, while some others are at specified periods within the Induction Program. We first show a typical daily timetable.

Day 3 onwards 06:00 am		Activity Wake up call	Rema
1.	06:30 am - 07:10 am	Physical activity (mild exercise/ yoga)	
2.	07:15 am - 08:55 am	Bath, Breakfast, etc.	
3.	09:00 am - 10:55 am	Creative Arts / Universal Human Values	Half the groups
4.	11:00 am - 12:55 pm	Universal Human Values/ Creative Arts	
5.	01:00 pm - 02:25 pm	Lunch	
6.	02:30 pm - 03:55 pm	Afternoon Session See below.	
7.	04:00 pm - 05:00 pm	Afternoon Session See below.	
8.	05:00 pm - 05:25 pm	Break / light tea	
9.	05:30 pm - 06:45 pm	Games / Special Lectures	
10.	06:50 pm - 08:25 pm	Rest and Dinner	
11.	08:30 pm - 09:25 pm	Informal interactions (in hostels)	

Sundays are off. Saturdays have the same schedule as above or have outings.

3.4 Follow Up after Closure: A question comes up as to what would be the follow up program after the formal

3-week Induction Program is over? The groups which are formed should function

as mentor mentee network. A student should feel free to approach his faculty mentor or the student guide, when facing any kind of problem, whether academic or financial or psychological etc. (For every 10 undergraduate first year students, there would be a senior student as a student guide, and for every 20 students, there would be a faculty mentor.) Such a group should remain for the entire 4-5 year duration of the stay of the student. Therefore, it would be good to have groups with the students as well as teachers from the same department/discipline. Here we list some important suggestions which have come up and which have been experimented with.

3.4.1 Follow Up after Closure – Same Semester

It is suggested that the groups meet with their faculty mentors once a month, within the semester after the 3-week Induction Program is over. This should be a scheduled meeting shown in the timetable. (The groups are of course free to meet together on their own more often, for the student groups to be invited to their faculty mentor"s home for dinner or tea, nature walk, etc.)

3.4.2 Follow Up – Subsequent Semesters

It is extremely important that continuity be maintained in subsequent semesters.

It is suggested that at the start of the subsequent semesters (upto fourth semester), three days be set aside for three full days of activities related to follow up to Induction Program. The students be shown inspiring films, do collective art work, and group discussions be conducted. Subsequently, the groups should meet at least once a month.

4 Summaries

Engineering institutions were set up to generate well trained manpower in engineering with a feeling of responsibility towards oneself, one's family, and society. The incoming undergraduate students are driven by their parents and society to join engineering without understanding their own interests and talents. As a result, most students fail to link up with the goals of their own institution.

The graduating student must have values as a human being, and knowledge and meta skills related to his/her profession as an engineer and as a citizen. Most students who get demotivated to study engineering or their branch, also lose interest in learning.

The Induction Program is designed to make the newly joined students feel comfortable, sensitize them towards exploring their academic interests and activities, reducing competition and making them work for excellence, promote bonding within them, build relations between teachers and students, give a broader view of life, and building of character.

The Universal Human Values component, which acts as an anchor, develops awareness and sensitivity, feeling of equality, compassion and oneness, draw attention to society and we are aware that there are advantages in mixing the students from different depts. However, in mixing, it is our experience that the continuity of the group together with the faculty mentor breaks down soon after. Therefore, the groups be from the same dept. but hostel wings have the mixed students from different depts. For example, the hostel room allotment should be in alphabetical order irrespective of dept. nature, and character to follow through. It also makes them reflect on their relationship with their families and extended family in the college (with hostel staff and others). It also connects students with each other and with teachers so that they can share any difficulty they might be facing and seek help.

BTech Syllabus

HANDLOOM & TEXTILE TECHNOLOGY

DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY, UTTAR PRADESH, LUCKNOW

EVALUATION SCHEME & SYLLABUS

FOR

B. TECH. SECOND YEAR

HANDLOOM & TEXTILE TECHNOLOGY

AS PER

AICTE MODEL CURRICULUM

[Effective from the Session: 2021-22]

HANDLOOM & TEXTILE TECHNOLOGY

SEMESTER- III

Sl. No.	Subject Codes	Subject	L	T	P	CT	TA	Total	PS	TE	PE	Total	Credit
			Periods			Evaluation Scheme				End Semester			
1		Engg. Science Course/Maths IV	3	1	0	30	20	50		100		150	4
2		Technical Communication/Universal Human values	2	1	0	30	20	50		100		150	3
			3	0	0								
3	KHT301	Principle of Yarn Manufacture	3	1	0	30	20	50		100		150	4
4	KHT302	Weaving Technology - I	3	1	0	30	20	50		100		150	4
5	KHT303	Textile Fiber	3	0	0	30	20	50		100		150	3
6	KHT351	Yarn Manufacture Lab	0	0	2				25		25	50	1
7	KHT352	Weaving Technology - I Lab	0	0	2				25		25	50	1
8	KHT353	Identification of Textile Fiber Laboratory	0	0	2				25		25	50	1
9	KHT354	Mini Project or Internship Assessment*	0	0	2			50				50	1
10		Computer System Security/Python Programming	2	0	0	15	10	25		50			0
11		MOOCs (Essential for Hons. Degree)											
		Total										950	22

*The Mini Project or internship (3-4 weeks) conducted during summer break after II semester and will be assessed during III semester.

SEMESTER- IV

Sl. No.	Subject Codes	Subject	L	T	P	CT	TA	Total	PS	TE	PE	Total	Credit
			Periods			Evaluation Scheme				End Semester			
1		(Maths-III/ Maths-IV / Maths-V) /Engineering Science Course [ESC]	3	1	0	30	20	50		100		150	4
2		Universal Human Values and Professional Ethics/Technical Communication	3	0	0	30	20	50		100		150	3
			2	1	0								
3	KHT401	Chemical Processing of Textiles -I	3	0	0	30	20	50		100		150	3
4	KHT402	Handloom Weaving Technology	3	1	0	30	20	50		100		150	4
5	KHT403	Fabric Structure - I	3	1	0	30	20	50		100		150	4
6	KHT451	Chemical Processing of Textiles –I Lab	0	0	2				25		25	50	1
7	KHT452	Handloom Weaving Technology Lab	0	0	2				25		25	50	1
8	KHT453	Fabric Analysis Lab	0	0	2				25		25	50	1
9		Python Programming/ Computer System Security	2	0	0	15	10	25		50			0
10		MOOCs (Essential for Hons. Degree)											
		Total										900	21

HANDLOOM & TEXTILE TECHNOLOGY

KHT-301: PRINCIPLE OF YARN MANUFACTURE

COURSE OBJECTIVES:
➤ To enable the students to understand about the concepts of yarn manufacturing with conventional and non- conventional spinning systems.

UNIT 1
Terms & definitions of various yarn parameters such as like Count, Twist, Strength etc. Process flow chart and brief idea of process sequences of carded & combed yarn **Ginning** – Objective, classification and working. **Opening and cleaning in blow room**–Introduction, Objective, Methods, **production calculation.** Recent developmesnts.

UNIT 2
Carding- Objectives and working principle of carding machine, stripping, Coiling mechanism, neps/hooks formation, Production and efficiency calculation**. **Recent developments. **Draw Frame**-Objects of drawing, different drafting systems, ideal drafting and draft and efficiency calculation. Recent developments**.**

UNIT 3
Combing- Objectives, cottons suitable for combing, preparation of stock for combing, combing cycle, noil extraction at backward feed and forward feed comber. Recent developments
Speed Frame: Objectives of, important parts of speed frame and their functioning, Mechanism involved in drafting, twisting, and winding, different types of roller drafting systems, Common defects in roving package.

UNIT 4
Ring spinning Process: Introduction and objective of ring frame, important parts of ring frame and their functions, principle and mechanism involved in drafting, twisting and winding, Spinning Geometry, Types of rings and travelers, mechanism of cop formation, common package size, calculations related to ring frame machine and its production. Brief introduction of Ring doublers, TFO.

UNIT 5
Non-conventional spinning processes: Principle of open end spinning, rotor spinning, chief organs and their functions, yarn properties in comparison with ring-spun yarn, principle of friction spinning, function of chief organs, yarn properties and comparison of Dref-II and Dref-III friction spinning machines, basic principle to air jet spun yarn, functions of chief organs, yarn properties.

OUTCOMES: Upon completion of the course the student will be able to know about:-
   i.   Pre-spinning process, i.e., from blow room to roving frame
   ii. Ring spinning process, including production calculation.
   iii. Non-conventional spinning process, i.e., open end spinning systems.

HANDLOOM & TEXTILE TECHNOLOGY

REFERENCE:

1. Man made fibre and their processing by Klein W
2. Spinning of man-made and blends on cotton systems by K.R.Salhotra
3. Manual of cotton spinning by Frank Fharnley
4. Klein W, "Manual of Textile Technology", The Textile Institute, Manchester, Vol.1and3, 2002.
5. Klein W, "A Practical Guide to Ring Spinning", The Textile Institute, Manchester, Vol 4. 2002.
6. Klein W, "New Spinning Process", The Textile Institute, Manchester, Vol.5, 2002.
7. Lawrence C A, "Fundamental of Spun Yarn Technology" CRC Press, USA, 2003.
8. Lord P R, "Handbook of Yarn Production", The Textile Institute, Woodhead Publication Limited, Cambridge, 2003.
9. Oxtoby E, "Spun Yarn Technology", Butterworth and Co. Ltd., 1987.

HANDLOOM & TEXTILE TECHNOLOGY
KHT-302: WEAVING TECHNOLOGY – I

COURSE OBJECTIVES:
➤ To enable the students to understand about the concepts of preparatory process of fabric manufacturing.

UNIT 1
Introduction to numbering of yarns; indirect system of numbering of yarns – New English cotton, New French, metric, worsted, Woolen Yorkshire Skein, linen, spun yarn, Direct system of numbering of yarns – Denier metric, flax/ jute/ hemp, Universal system of yarn numbering – Tex and its derivatives - Millitex, Kilotex; Determination of conversion factors, Conversion of count of yarn - indirect to indirect, direct to direct, indirect to direct, direct to indirect systems.

UNIT 2
Determination of Equivalent/Resultant count of folded yarns with and without contraction during twisting, Costing of folded yarn, Average count of warp. Read Count - dents per linear space and groups of dents per linear space models, Stockport System of Reed count - relation between reed count, number of ends per dent, ends per inch, cloth width, reed width and total number of ends, heald count calculations.

UNIT 3
Objects of winding; principles of cheese and cone winding machines;drum and precision winding; uniform build of yarn package; control of balloons; Classification of yarn faults and its removal; concepts in yarn clearing –mechanical, optical and electronic clearers; knotters and splicers, weft winding; study of modern automatic winders, Yarn winding calculations-Cone cheese and pirn efficiency, production and production planning.

UNIT 4
Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines. Sizing objectives of sizing; sizing materials and recipe used for different types of fibers; size preparation equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and sizing. Control concepts in modern sizing; energy conservation in sizing, Performance assessment and calculations.

UNIT 5
Need for drawing-in operation; manual and automatic drawing- in, leasing, knotting and pinning machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends and calculations.

HANDLOOM & TEXTILE TECHNOLOGY

OUTCOMES: Upon completion of the course the student will be able to know about:-
  i.   Different Yarn Count/Numbering Systems.
  ii. Winding principle, different type of yarn packages and machine used for winding.
  iii. Warping, Sizing and Drawing-in process including their mathematical calculations.

REFERENCES:
1. Principles of weaving By Marks A.T.C. & Robinson.
2. Weaving By Prof. DB Ajgaonkar, Prof. Sriramalu & Prof. MK Talukdar.
3. Weaving Mechanism by K.T. Aswani.
4. Yarn Preparation-Vol-I by Sengupta.
5. Weaving Calculation by Sengupta.
6. Textile Mathematics-Vol. I by JE Booth. 8.Fibre to Fabric by PR Lord
7. Winding &Warping by Talukdar MK.

HANDLOOM & TEXTILE TECHNOLOGY
KHT-303: TEXTILE FIBER

COURSE OBJECTIVES

➤ To enable the students to understand about the classification properties of textile fiber and their production process.

UNIT 1

Introduction: Various definitions related to textile fibres, classification of textile fibres, essential & desirable properties of textile fibres, advantages & disadvantages of natural and manmade fibres, concepts of molecular weight, degree of polymerization, orientation and crystallinity, characteristics of fibre forming polymer.

UNIT 2

Cotton : Cultivation and harvesting, cotton varieties and grading, morphological structure, physical and chemical properties of cotton fibre and its applications, formation of hydro-cellulose and oxy-cellulose. Jute cultivation, retting and extraction process, structure of jute fibre, physical and chemical properties of jute fibre and its applications.

UNIT 3

Types of wool and its grading, Morphological structure, chemical composition, physical & chemical properties of wool fibre and its applications, Types of silk and its production, Silk weighting, degumming of silk, chemical composition and morphological structure of silk, physical & chemical properties of silk and its applications.

UNIT 4

Techniques of Spinning of manmade fibers: Wet Spinning, Dry Spinning, Melt Spinning. Drawing of fibers.   Application of Spin Finish. Texturizing Importance of texturising process. Types of texturising process. Manufacturing process of viscose fiber, Cellulose acetate, Lyocell; Physical and Chemical properties of Viscose, cellulose acetate and Lyocell.

UNIT 5

Manufacturing process of polyester fiber,Physical and chemical properties of polyester fiber. Manufacturing process of Nylon-6 & Nylon-66, Physical and Chemical properties of Polyamide fibers. Manufacturing process of Acrylonitrile fibers, Physical and Chemical properties of acrylonitrile fiber.   Manufacturing process of PE & PP fibers, Physical and Chemical properties of PE & PP fibers. Concept of low density & high density polyethylene fibres.

OUTCOMES: Upon completion of the course the student will be able to know about:-
  i.   Definitions and Technical terms used in processing of Textile fibers.
  ii.   Various essential and desirable properties of Textile fibers.
  iii. Morphology of various natural fibers.
  iv.   Physical, Chemical properties and production process of various man-made fiber.

REFERENCES:
1. WE Morton & JWS Hearle, Physical properties of textile fibres, Textile Institute, U.K.
2. Progress in textiles: Science and technology Vol.-2 by Dr. VK Kothari, IIT Delhi.
3. Hand book of textile fibres by J. Gordon Cook.
4. Fibre Science and Technology, S.P. Mishra.

HANDLOOM & TEXTILE TECHNOLOGY

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KHT-351: YARN MANUFACTURE LABORATORY

LIST OF EXPERIMENTS:

1. Practice in handling and operation of blow room.
2. Study of constructional details of machinery in blow room.
3. Production calculation of blow room.
4. Study of carding machine with technical details.
5. Study of the `NEP -COUNT' in a card.
6. Study of drafting arrangement and top roller weighting system of draw frame machine.
7. Calculation of the total draft and its distribution in draw frame machine.
8. To study the drafting, twisting and winding zone of speed frame.
9. To study the drafting, twisting and winding zone in ring frame.
10. To study the building motion in ring frame.
11. Calculation of draft constants, twist constant, coils per inch and production of ring frame.
12. To study the timing diagram of a comber.
13. To study the function of top comb and its depth of penetration with reference to noil extraction and fractionating efficiency (mill based study).

HANDLOOM & TEXTILE TECHNOLOGY
KHT-352: WEAVING TECHNOLOGY - I LABORATORY

LIST OF EXPERIMENTS:

1. Study of weaving preparatory and weaving Processes.
2. Study in Drawing-in, Denting and gaiting-up process.
3. Study of loom drive, loom timing, passage of material and primary motions.
4. Study of precision and drum winding machine.
5. Study of cheese winding machine.
6. Study of auto-coner its functions.
7. Study of pirn winding machine.
8. Study of sectional warping machine.
9. Study of beam warping machine.
10. Study of Sizing process.

HANDLOOM & TEXTILE TECHNOLOGY
KHT-353: IDENTIFICATION OF TEXTILE FIBER LABORATORY

LIST OF EXPERIMENTS:

1. Analysis of water sample for assessment of various types of hardness.

2. Estimation of Soda Ash sample for assessment of its percentage purity.

3. Estimation of Caustic Soda sample for assessment of its percentage purity.

4. Estimation of Bleaching powder sample for assessment of its percentage purity.

5. Estimation of Hydrogen peroxide sample for assessment of its percentage purity.

6. Estimation of Sulphuric acid sample for assessment of its percentage purity.

7. Estimation of Hydrochloric acid sample for assessment of its percentage purity.

8. Estimation of Sodium hydrosulphite sample for assessment of its percentage purity.

9. Identification of textile fibres by microscopic test.

10. Identification of textile fibres by burning test.

11. Identification of textile fibres by solubility test.

12. Analysis of blended yarn and fabric comprising of cotton, viscose and polyester.

<u>SEMESTER-IV</u>

HANDLOOM & TEXTILE TECHNOLOGY

KHT-401: CHEMICAL PROCESSING OF TEXTILE-I

COURSE OBJECTIVES:
➤ To enable the students to understand about the concepts of preparatory process of Chemical Processing of Textile.

UNIT 1
Role of water & its quality for wet processing, Principle and application of surfactant in textile processing, Sequence of chemical processing, of textiles, natural and added impurities in textiles, Various preparatory processes for cotton, wool, silk, nylon, polyester, acrylic and blends including optical whitening.

UNIT 2
Objectives of desizing, scouring, bleaching and mercerization of textile materials, Different types of desizing and bleaching agents, methods of desizing, singeing, scouring and bleaching of textile material, various faults in bleaching and their remedies and removal.
Total Lectures required

UNIT 3
Objective of heat setting, Objective of mercerization, physical and chemical aspects of mercerization, method and types of heat setting and mercerizing, yarn and fabric mercerizing, Optical brightening agents, and their application.

UNIT 4
Brief introduction to processing machinery and new processes development in machinery for preparatory and dyeing.

UNIT 5
General Consideration and classification of textile auxiliaries, Physical principles involved in detergency conditions for efficient detergency, Preparation of detergents.

OUTCOMES: Upon completion of the course the student will be able to know about:-
i. Process sequence of chemical processing of textiles.

ii. Desizing, Scouring, Bleaching and Mercerization of Textile materials.

iii. Concept of heat setting.

iv. Machine used in preparatory of chemical processing.

REFERANCE:
1. Chemical processing of cotton and p/c blends – ATIRA
2. A glimps on the chemical technology and textile fibres by R.R. Chackrawartty
3. Technology of bleaching and mercerization by V.A. Shenai
4. Technology of finishing by V.A. Shenai

HANDLOOM & TEXTILE TECHNOLOGY

KHT-402: HANDLOOM WEAVING TECHNOLOGY

COURSE OBJECTIVES:
➤ To enable the students to understand about the concepts of various techniques and process used in Handloom weaving technology.

UNIT 1
Yarn packages - hanks, cones, cheeses, and spools - Characteristics and use; essential characteristic of warp and weft, Objectives of winding and warping, peg warping, vertical warping and sectional warping; objectives and importance of sizing of cotton yarn, ingredients used in size mixture for handloom industry and their functions, various forms of sizing- hank sizing and street warp sizing; Characteristics of ideal sizing, common defects during sizing- causes and remedies.

UNIT 2
Evolution of handlooms, Various parts of a handloom and their functions, types of handlooms- Throw shuttle handloom, Fly shuttle pit loom and frame loom; Relationship between type of handloom and the product, passage of warp in frame loom; motions of a handloom; definitions of primary, secondary & auxiliary, motions; Types of shed formations– centre closed shed, bottom closed shed, top closed shed, open shed and semi open shed - advantages, disadvantages and shedding devices; shedding mechanism of a handloom using treadles and heald reversing motions – roller system, pulley reversing system and jack and lam rod system.

UNIT 3
Picking mechanism of a handloom, types of shuttles – throw shuttle, fly shuttle and roller shuttle, design and suitability; beat-up- open shed beat-up, closed shed beat up and crossed shed beat-up in handlooms, different types of reed – bamboo reed, steel reed and all metal steel reed, suitability for various fabrics; let off motion in handlooms – ratchet wheel and pawl, rope and weight, rope lever and weight motions; take up motion in handloom – poker rod, ratchet wheel & pawl; auxiliary motions of a handloom – temple motion and terry motion; handloom dobbies – lattice dobby, barrel dobby and vertical dobby.

UNIT 4
Traditional Design Weaving Techniques of Handlooms - Adai (Warp & Weft) of Kancheepuram, Jala Weaving of Varanasi, Jamdani Weaving of West Bengal, Paithani Weaving of Aurangabad.

UNIT 5
Warp Tie&Dye Technique – Design preparation, design transfer to warp, weaving.
Weft Tie&Dye Technique – Design preparation, design transfer to weft, weaving.
Combined Warp and weft Tie&Dye Technique – Design preparation, design transfer to warp and weft, weaving.

HANDLOOM & TEXTILE TECHNOLOGY

OUTCOMES: Upon completion of the course, the student will be able to know about-
  i.   Various yarn packages and sizing ingredients
  ii.   Various parts of handloom, their function and working.
  iii. Concepts of various traditional designs and their weaving techniques.

REFERENCES:
1. Yarn preparation by R. Sengupta
2. An introduction to winding & warping by M.K. Talukdar
3. Modern preparation & weaving machinery by A Ormerod, Textile Institute, U.K.
4. Sizing by Prof. D. B. Ajgaonkar, Dr. M. K. Talukdar & V. R. Wadekar.
5. The Technology of Warp Sizing by J.B. Smith.
6. Modern Preparation & Weaving by A. Ormerod

KHT-403: FABRIC STRUCTURE – I

HANDLOOM & TEXTILE TECHNOLOGY

COURSE OBJECTIVES:
➤ To enable the students to understand about the manufacturing/construction process of various types of weaves used in Handloom and modern Textile industries.

UNIT 1
Classification of textile fabrics; classification of woven fabrics- simple, compound and complex; fundamental aspects of woven fabrics - count of graph paper, factors influencing the selection of appropriate count of graph paper, graphical representation of structure of a woven fabric- warp way and weft way; study of plain weave, ornamentation of plain weaves; study of derivative structures of plain weave – regular and irregular warp rib, weft rib, hopsack weaves. catch-cord technique for weaving warp rib and hop-sack; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT 2
Study of twill weaves up to 12 threads, classification of twills - warp faced twill, weft faced twill and equal faced twill; angle of inclination of twill diagonals, influence of the twist direction of yarn over prominence of twill lines; study of derivatives of twill weaves - wavy twill, herringbone, transposed twill, broken twill and curved twill, elongated twill, combined twill, shaded twill and figured twill; diamond, diaper; regular and irregular sateen and satin up to 12 threads, dice check using twill and satin weaves; design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT 3
Study of honey comb weaves - Ordinary honey comb and Brighton honey comb – cell formation; study of Huck-a-Back, mock leno and corkscrew weaves. Crepe weaves – construction upon sateen base, by combination of floating weaves with plain thread, by reversing and by insertion of one weave over another; design, draft, and peg/tie-up plan and thread interlacing diagram of above weaves. Colour and weave effect- simple colour and weave effect, continuous line effects, hound's tooth patterns, bird's eye and spot effects, hairline stripes, step patterns, and all over effects; combination of weaves – twill and plain, mock leno and plain, honey comb and plain, stripe and check effect by these combinations; distorted thread effects – salient feature, warp and weft distortion.

UNIT 4
Bedford cord weaves – salient features, plain faced Bedford cord (regular and alternate pick principle), twill faced bed ford cord, wadded bed ford cord, and crepon Bedford cords; welt structures – salient features and manufacturing techniques, ordinary welts, wadded welts (loose back and fast back); design, draft, denting, peg/tie-up plan and thread interlacing diagram of above weaves.

UNIT 5
Backed cloths- warp & weft backed cloths using twill, sateen and satin.; weft wadded warp backed

cloth, reversible and non-reversible fabrics using twill, satin and sateen, weft backed cloth - reversible and non-reversible weft backed cloth using twill, satin and sateen, warp wadded weft backed cloth – reversible and non-reversible fabrics using twill, satin and sateen -Imitation backed cloth, imitation warp and weft backed cloths; design, draft, denting, peg/tie-up and thread interlacing diagram of above weaves.

OUTCOMES: Upon completion of the course the student will be able to know about:-
   i. Classification of woven fabrics.
  ii. Construction of simple and compound woven fabrics.
 iii. Design, Draft, Denting, Peg planning of simple and compound woven fabrics.

REFERENCES:
1. Grosicki Z. J., "Watson's Advanced Textile Design and Colour", Vol.II, Butterworths, London, 1989.
2. Wilson J., "Handbook of Textile Design", Textile Institute, Manchester, 2001.
3. Horne C.E., "Geometric Symmetry in Patterns and Tilings", Textile Institute, Manchester,2000.
4. Seyam A. M., "Structural Design of Woven Fabrics, Theory and Practice", TextilInstitute,Manchester, 2002. Georner D,
5. "Woven Structure and Design, part 1: Single Cloth Construction", WIRA, U.K., 1986.
6. Georner D, "Woven Structure and Design, Part 2: Compound Structures", WIRA,U.K., 1989.

KHT-451: CHEMICAL PROCESSING OF TEXTILE-I LABORATORY

LIST OF EXPERIMENTS:

HANDLOOM & TEXTILE TECHNOLOGY

1. Scouring of cotton.
2. Scouring of polyester, nylon and acrylic.
3. Scouring of blend.
4. Scouring of wool.
5. Degumming of silk.
6. Bleaching of cotton with NaOCl.
7. Bleaching of cotton with H2O2.
8. Bleaching of cotton with NaClO2.
9. Bleaching of polyester, Nylon and Acrylic.
10. Bleaching of blend.
11. Bleaching of wool and silk.
12. Bleaching of jute yarns / fabric.
13. Mercerization of cotton.
14. Optical whitening agent treatment on Textile materials.

————————————

HANDLOOM & TEXTILE TECHNOLOGY

KHT-452: HANDLOOM WEAVING TECHNOLOGY LABORATORY

LIST OF EXPERIMENTS:

1. Drawing sketches of different parts of handlooms with specifications and joining threads
2. by piecing and knotting.
3. Study of drawing–in, denting and gaiting up.
4. Study of winding of yarn on double flanged bobbins and pirns using charka.
5. Study of warping on peg warping frame.
6. Study of warping on sectional warping machine.
7. Preparing JALA frame to produce extra weft buta design.
8. Study of single Ikat and double Ikat design.
9. Study of weave, peg/tie-up plan and loom setting on multi treadle frame loom.
10. Development of fabric samples using Plain and its derivatives.
11. Development of fabric samples using twill weave and its derivatives.
12. Development of fabric samples using Mock-Leno weave.
13. Development of fabric samples using Honey Comb weave.
14. Development of fabric samples using Huck-A-Back weave.

———————————

HANDLOOM & TEXTILE TECHNOLOGY

KHT-453: FABRIC ANALYSIS LABORATORY

LIST OF EXPERIMENTS:

1. General principles of cloth analysis.
2. Extracting warp and weft pattern.
3. Analysis of derivatives of plain, twill and satin fabrics.
4. Extracting fundamental details like count of warp and weft, ends and picks per unit space; warp and weft crimp and weave repeat.
5. Deriving drafting, denting, peg-plan/ tie-up for the weave.
6. Preparation of Design, draft, denting plan and tei-up plan of all the weaves dealt in Fabric Structure – I.
7. Practicing to do drafting in the loom as per drafting order derived for the weaves dealt in Fabric Structure – I.
8. Developing sample without any defects as peg plan/ treadling order derived for the weaves dealt in Fabric Structure – I.
9. Preparing the album of the samples developed and writing their quality particulars.
10. To ascertain the G.S.M. of the fabrics.

Academic Calendar

No.22/3/2020-DCHL/Estt.II
Government of India
Ministry of Textiles
Office of the Development Commissioner for Handlooms
*****

Udyog Bhawan, New Delhi,
Dated the 9th February, 2022.

To
The Director (Institute),
I.I.H.T,
VARANASI.

Sub: Minutes of the meeting of Sub Committee-I of BOAA held on 12.01.2022 – regarding.

Sir,

Please refer to your letter No.IIHTV/Exam-3/BOAA/118 dated 25.01.2022 on the subject cited above.

2.   In this connection, I am directed to convey the approval of D.C (Handlooms) for the Academic Calendar for the year 2021-22 in IIHTs, as per details given below:-

Description	3rd, 5th Semester of DHTT & 3rd Semester PDTP	1st Semester of DHTT & PDTP
Commencement of classes for the academic year 2021-22	01.09.2021	--
Commencement of induction programs	--	11.10.2021
Commencement of classes for 1st Semester DHTT & PDTP	--	01.11.2021
Completion of classes	15.01.2022	25.02.2022
Conduct of semester practical examinations Nov/Dec. 2021 & backlog practical examinations, if any	During the first fortnight of January, 2022 or after the reopening of the institute with normalizing of COVID-19 pandemic as the case may be	26.02.2022 to 04.03.2022
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Odd Semester vacation	(Due to the requirement of conducting online classes, there will not be winter vacation. However EL will be credited for the faculty members as per the Extant Rule)	

	4th & 6th Semester DHTT	2nd Semester of DHTT & PDTP
Commencement Even semester	24.01.2022 to 25.02.2022, 04.04.2022 to 25.06.2022	21.03.2022 to 08.07.2022
Completion of classes for April/ May 2022	25.06.2022	08.07.2022
Commencement of practical examinations and project viva-voce	27.06.2022	11.07.2022
Conduct of theory examinations	11.07.2022 to 04.08.2022	18.07.2022 to 22.07.2022
Summer vacation for 4th Semester / Internship for 2nd Semester	05.08.2022 to 15.08.2022	23.07.2022 to 12.08.2022
Commencement of next academic year 2022-23	16.08.2022	16.08.2022

3. Approval of the competent authority is also conveyed for the moderation of question papers at IIHT, Salem with the subject experts available from nearby colleges, besides IIHT, Salem, under the supervision of the Director (Institute), IIHT, Salem and the Convenor, BoAA.

Yours faithfully,

(Visalakshi Sivanandan)
Assistant Director
Phone : 011-2306 1734,
E-mail : estt2.dchl-textiles@gov.in

Academic Time Table with the name of the Faculty members Handling the Course

Time Table DHTT

IIHT VARNASI
Programme: DHTT

Effective From: 21-03-2022
Semester: 2[nd] Sem. (2021-22)

Day/Period	I (10-11)	II (11-12)	III (12-1)	(1-2)	IV (2-3)	V (3-4)	VI (4-5)
MONDAY	BS102 Mathematics – II (RKY)	ES102 Introduction to IT System (NY)	ES104 Fundamentals of Electrical &Electronics Engineering (SKG/PKS)	L U N C H – – – B R E A K	ES106 Engineering Mechanics (AM)	Library	BS103 Applied Physics (MKS)
TUESDAY	BS102 Mathematics – II (RKY)	ES102 Introduction to IT System (NY)	BS103 Applied Physics (MKS)		ES106 Engineering Mechanics (AM)	ES110 Fundamentals of Electrical & Electronics Engineering Lab (SKG/PKS&AKS) -Batch B / ES108 Introduction to IT System (NY&KM) -Batch A	
WEDNESDAY	ES106 Engineering Mechanics (AM)	ES110 Fundamentals of Electrical & Electronics Engineering Lab (SKG/PKS&AKS) -Batch A / ES108 Introduction to IT System (NY& KM) -Batch B			ES104 Fundamentals of Electrical & Electronics Engineering (SKG/PKS)	Seminar	
THURSDAY	BS102 Mathematics – II (RKY)	ES102 Introduction to IT System (NY)	ES106 Engineering Mechanics Tutorial (AM)		ES104 Fundamentals of Electrical & Electronics Engineering (SKG/PKS)	BS107 Applied Physics Lab (MKS)-Batch B / ES112 Engineering Mechanics Lab (AM)-Batch A	
FRIDAY	BS102 Mathematics – II (RKY)	BS107 Applied Physics Lab (MKS)-Batch A / ES112 Engineering Mechanics Lab (AM)-Batch B			BS103 Applied Physics (MKS)	Sports (BK)	
SATURDAY	ES102 Introduction to IT System (NY)	ES104 Fundamentals of Electrical Electronics Engineering-Tutorial (SKG/PKS)	BS103 Applied Physics-Tutorial (MKS)		BS102 Mathematics – II Tutorial (RKY)	Seminar	

Name of Faculty: RKY: Mr. Raj Kumar Yadav, NY: Ms. Neeta Yadav, SKG: Mr. Saurabh Kumar Gupta, PKS: Mr. Prashant Kumar Singh, MKS: Mr. Manish Kumar Srivastava, AM: Mr. Abhinav Mishra, AKS: Mr. Abhishek Kumar Srivastava: KM: Ms. Kiran Maurya, BK: Mr. Brijesh Kumar

Dr. P. Thennarasu
(Director)

IIHT VARANASI

Effective from: 14-02-2022

COURSE: DHTT

Class & Year – IV Sem. 2021-22

Day / Period	I (10-11)	II (11-12)	III (12-1)	(1-2)	IV (2-3)	V (3-4)	VI (4-5)
Monday	Batch- A- Colour Concepts and Textile Designing Practice -II (M. Karthick) / Batch- B- Chemical Processing Practice -II (SKP AKB)			L u n c h B r e a k	Professional Ethics & Personality Development (MPD)	Textile Calculation-III (AKS)	Chemical Processing of Textiles – II (SKP)
Tuesday	Textile Calculation-III (AKS)	Fabric Structure – III (DKD)	Weaving Technology (SKP)		Batch –A – Weaving Technology Practice –III (DKD OP/LC) / Batch- B- Colour Concepts and Textile Designing Practice -II (M. Karthick)		
Wednesday	Batch- A- Chemical Processing Practice -II (PC AKB) / Batch –B– Weaving Technology Practice –III (DKD OP/LC)				Ecology & Pollution Control in Textile Industry (MKS)	Chemical Processing of Textiles – II (SKP)	Fabric Structure – III (DKD)
Thursday	Fabric Structure – III (DKD)	Ecology & Pollution Control in Textile Industry (MKS)	Weaving Technology (SKP)		Ecology & Pollution Control in Textile Industry (VKC)	Professional Ethics & Personality Development (MPD)	Chemical Processing of Textiles – II (SKP)
Friday	Professional Ethics & Personality Development (MPD)	Ecology & Pollution Control in Textile Industry (VKC)	Chemical Processing of Textiles – II (SKP)		Batch –A – Weaving Technology Practice –III (DKD OP/LC) / Batch –B – Chemical Processing Practice –II (SKP AKB)		
Saturday	Batch- A- Chemical Processing Practice -II (SKP AKB) / Batch –B Weaving Technology Practice –III (DKD OP/LC)				Fabric Structure – III (DKD)	Sports	Sports

AKS- Sh. Ashok Kumar Singh **DKD-** Sh. Dillip Kumar Das **MPD-** Mahesh Pratap Dubey **VKC:** Dr. Vinay Kr. Chauhan
SKP- Sh. Sunil Kumar Pandey **MKS-** Manish Kumar Srivastava **OP-** Om Prakash **LC-** Lalchand Prasad
MK- M Karthick **AKB-** Arun Kumar Bharti

(Dr. P. Thennarasu)
Director

COURSE: **DHTT**   Class & Year – **VI Sem. 2021-22**

Day / Period	I (10-11)	II (11-12)	III (12-1)	(1-2)	IV (2-3)	V (3-4)	VI (4-5)
Monday	Chemical Processing of Textiles – IV (VKC)	Principles of Textile Testing –II (RR)	Weaving Technology & Textile Calculation- V (DKD)		Batch-A- Chem. Processing of Textile Practice-IV & CCM (VKC DP) Batch-B- Textile Testing Practice-II (RR SPV/MK)		
Tuesday	Batch-A- Weaving Technology Practice - IV & CATD (AKS LC/AS) Batch-B- Chem. Processing of Textile Practice-IV & CCM (VKC DP)				Principles of Textile Testing –II (RR)	Fabric Structure -V (AKS)	Weaving Technology & Textile Calculation- V (DKD)
Wednesday	Weaving Technology & Textile Calculation- V (DKD)	Fabric Structure-V (AKS)	Chemical Processing of Textiles – IV (VKC)	INTERVAL	Batch-A- Chem. Processing of Textile Practice-IV & CCM (VKC DP) Batch-B- Weaving Technology Practice - IV & CATD (AKS LC/AS)		
Thursday	Chemical Processing of Textiles – IV (∀KC)	Fabric Structure-V (AKS)	Principles of Textile Testing –II (RR)		Batch-A- Weaving Technology Practice - IV & CATD (AKS LC/AS) Batch-B- Chem. Processing of Textile Practice-IV & CCM (VKC DP)		
Friday	Batch-A- Textile Testing Practice-II (RR SPV/MK) Batch-B- Weaving Technology Practice - IV & CATD (AKS LC/AS)				Chemical Processing of Textiles – IV (VKC)	Sports	Sports
Saturday	Principles of Textile Testing –II (RR)	Fabric Structure-V (AKS)	Weaving Technology & Textile Calculation- V (DKD)		Project Work		

AKS- Sh. Ashok Kumar Singh **DKD-** Sh. Dillip Kumar Das **VKC:** Dr. Vinay Kr. Chauhan
RR- Sh. Ramratan **SPV-** Shambhu Prasad Verma **DP-** Dakshveer Prasad
LC- Lalchand Prasad **MK-** M Karthick **AS-** Amit Shukla

(Dr. P. Thennarasu)
Director

PDTP Time

IIHT VARANASI

TIME TABLE

Effective from: 21-03-2022

COURSE: **PDTP**

Semester: **2nd Sem. (2021-22)**

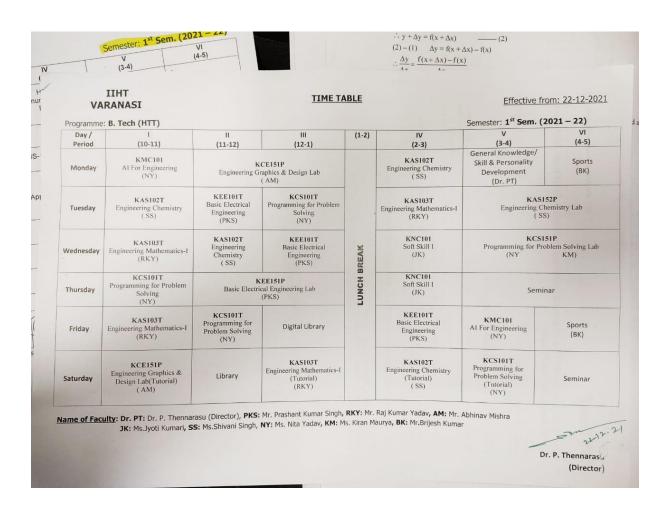| Day / Period	I (10-11)	II (11-12)	III (12-1)	(1-2)	IV (2-3)	V (3-4)	VI (4-5)
Monday	PDTP207- Computer Colour Matching Practice (VKC - DP)				PDTP204- Technology of Printing – I (SKP)	PDTP203- Technology of Dyeing- II (VKC)	PDTP202- Soft Skills & Personality Development (MPD)
Tuesday	PDTP204- Technology of Printing – I (SKP)	PDTP201- Textile Testing & Quality Control (RR)	PDTP203- Technology of Dyeing- II (VKC)		PDTP206- Textile Dyeing Practice – II (VKC - DP)		
Wednesday	PDTP204- Technology of Printing – I (SKP)	PDTP201- Textile Testing & Quality Control (RR)	PDTP202- Soft Skills & Personality Development (MPD)	LUNCH BREAK	PDTP205- Textile Testing Practice (RR - SPV)		
Thursday	PDTP205- Textile Testing Practice (RR - SPV)				PDTP201- Textile Testing & Quality Control (RR)	PDTP203- Technology of Dyeing- II (VKC)	Library
Friday	PDTP207- Textile Dyeing Practice – II (VKC - DP)				PDTP204- Technology of Printing – I (SKP)	PDTP201- Textile Testing & Quality Control (RR)	Sports
Saturday	PDTP202- Soft Skills & Personality Development (MPD)	PDTP203- Technology of Dyeing- II (VKC)	Library		Seminar		...

RR: Dr. Ram Ratan, **VKC:** Dr. Vinay Kr. Chauhan, **MPD:** Mahesh P. Dubey, **SKP:** Sunil Kumar Pandey

SPV: Shambhu Prasad Verma, **DP:** Dakshveer Prasad

Dr. P. Thennarasu
(Director)

BTech Time Table

Semester: **1st Sem. (2021 – 22)**

	V (3-4)	VI (4-5)
IV		

IIHT VARANASI — TIME TABLE

Programme: B. Tech (HTT) Effective from: 22-12-2021 Semester: **1st Sem. (2021 – 22)**

Day / Period	I (10-11)	II (11-12)	III (12-1)	(1-2)	IV (2-3)	V (3-4)	VI (4-5)
Monday	KMC101 AI For Engineering (NY)	KCE151P Engineering Graphics & Design Lab (AM)			KAS102T Engineering Chemistry (SS)	General Knowledge/ Skill & Personality Development (Dr. PT)	Sports (BK)
Tuesday	KAS102T Engineering Chemistry (SS)	KEE101T Basic Electrical Engineering (PKS)	KCS101T Programming for Problem Solving (NY)		KAS103T Engineering Mathematics-I (RKY)	KAS152P Engineering Chemistry Lab (SS)	
Wednesday	KAS103T Engineering Mathematics-I (RKY)	KAS102T Engineering Chemistry (SS)	KEE101T Basic Electrical Engineering (PKS)	LUNCH BREAK	KNC101 Soft Skill I (JK)	KCS151P Programming for Problem Solving Lab (NY KM)	
Thursday	KCS101T Programming for Problem Solving (NY)	KEE151P Basic Electrical Engineering Lab (PKS)			KNC101 Soft Skill I (JK)	Seminar	
Friday	KAS103T Engineering Mathematics-I (RKY)	KCS101T Programming for Problem Solving (NY)	Digital Library		KEE101T Basic Electrical Engineering (PKS)	KMC101 AI For Engineering (NY)	Sports (BK)
Saturday	KCE151P Engineering Graphics & Design Lab(Tutorial) (AM)	Library	KAS103T Engineering Mathematics-I (Tutorial) (RKY)		KAS102T Engineering Chemistry (Tutorial) (SS)	KCS101T Programming for Problem Solving (Tutorial) (NY)	Seminar

Name of Faculty: Dr. PT: Dr. P. Thennarasu (Director), **PKS:** Mr. Prashant Kumar Singh, **RKY:** Mr. Raj Kumar Yadav, **AM:** Mr. Abhinav Mishra **JK:** Ms.Jyoti Kumari, **SS:** Ms.Shivani Singh, **NY:** Ms. Nita Yadav, **KM:** Ms. Kiran Maurya, **BK:** Mr.Brijesh Kumar

22/2.21

Dr. P. Thennaras (Director)

- **Teaching Load of Each Faculty:**- As per Curriculum.

- **Internal Continuous Evaluation System and Place**- Nil

- **Students assessment of Faculty**:- Nil

4. For each Post Graduate Courses give the following: N/A

- **Title of the Course:- N/A**

- **Curricula and Syllabi:- N/A**

- **Laboratory facilities exclusive to the post graduate Course:- N/A**

5. Special Purpose
- **Software all design tools in case**

Continental	CATD	Purchased
Arahne Weave	CATD	Purchased
Digibunai	CATD	Purchased

- **Academic Calendar and framework**

No.22/3/2020-DCHL/Estt.II
Government of India
Ministry of Textiles
Office of the Development Commissioner for Handlooms
*****

Udyog Bhawan, New Delhi,
Dated the 9th February, 2022.

To
The Director (Institute),
I.I.H.T,
VARANASI.

Sub: Minutes of the meeting of Sub Committee-I of BOAA held on 12.01.2022 – regarding.

Sir,

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3.   Approval of the competent authority is also conveyed for the moderation of question papers at IIHT, Salem with the subject experts available from nearby colleges, besides IIHT, Salem, under the supervision of the Director (Institute), IIHT, Salem and the Convenor, BoAA.

Yours faithfully,

(Visalakshi Sivanandan)
Assistant Director
Phone : 011-2306 1734,
E-mail : estt2.dchl-textiles@gov.in

6. Enrolment and placement Details

- **Placement Details**

सत्यमेव जयते
भारत सरकार / GOVERNMENT OF INDIA
वस्त्र मंत्रालय / MINISTRY OF TEXTILES
हथकरघा विकास आयुक्त कार्यालय
DEVELOPMENT COMMISSIONER FOR HANDLOOMS
भारतीय हथकरघा प्रौद्योगिकी संस्थान
INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
चौकाघाट, वाराणसी / Chowkaghat, Varanasi– 221002 (U.P.)
Email - iihtvns@gmail.com
Website – www.iihtvaranasi.edu.in
फोन नं. - 0542-2208329/2203833

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MENU

Jurisdiction of Institute   Governance Mechanism   Contact   Online Grievance   Alumni   Results   Downloads   RTI   Feedback   Event & Galary   NBA & NAAC

Placements for 2017-2018

S.No.	Name of the Company	Selected Candidates	Annual Package
1	Vardhman Textiles	04	2.8 Lakhs
2	Welspun	02	2.5 Lakhs
3	Lion Fabric Pvt Ltd	02	1.4 Lakhs
4	Elite Home Decor,	03	1.5 Lakhs
5	Gold Tex	02	1.4 Lakhs

Home   About Us   Director/Principals   Courses   Facilities   Placements   Infrastructure   Admin/Faculty   Jurisdiction of Institute   Governance Mechanism

Events   Contact   Alumni   Results

APPROVALS   UNIVERSITY NEWS   RULES & REGULATIONS   ALUMNI   CONFERENCES/WORKSHOPS/SYMPOSIUM/SEMINARS   VIRTUAL TOUR

सत्यमेव जयते
भारत सरकार / GOVERNMENT OF INDIA
वस्त्र मंत्रालय / MINISTRY OF TEXTILES
हथकरघा विकास आयुक्त कार्यालय
DEVELOPMENT COMMISSIONER FOR HANDLOOMS
भारतीय हथकरघा प्रौद्योगिकी संस्थान
INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
चौकाघाट, वाराणसी / Chowkaghat, Varanasi– 221002 (U.P.)
Email - iihtvns@gmail.com
Website – www.iihtvaranasi.edu.in
फोन नं. - 0542-2208329/2203833

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MENU

Jurisdiction of Institute   Governance Mechanism   Contact   Online Grievance   Alumni   Results   Downloads   RTI   Feedback   Event & Galary   NBA & NAAC

Placements for 2018-2019

S.No.	Name of the Company	Selected Candidates	Annual Package
1	Vardhman Textiles	04	2.8 Lakhs
2	Faze Three Ltd	10	1.5 Lakhs
3	Lion Fabric Pvt Ltd	04	1.4 Lakhs
4	Babu International	04	1.8 Lakhs
5	Elite Home Decor,	02	1.5 Lakhs
6	Gold Tex	02	1.4 Lakhs

Placements 2019 - 20

S.No.	Name of the Company	Selected Candidates	Annual Package
1	Devgiri Exports	3	1.8 Lakhs
2	Reid & Taylor	1	2 Lakhs
3	Rivira Textiles	2	1.8 Lakhs
4	Centex	2	1.9 Lakhs
5	Bhaskar Denim	2	1.9 Lakhs
6	C & R Textiles	2	1.8 Lakhs
7	Kanodia Global Ltd	2	1.8 Lakhs
8	Om Overseas	1	1.9 Lakhs
9	Narayan Industries	2	1.8 Lakhs
10	Shalon Group	1	1.9 Lakhs

Placements 2020 - 21

S.No.	Name of the Company	Selected Candidates	Annual Package
1	Shahi Exports	3	2 Lakhs
2	Centex	2	1.8 Lakhs
3	Devgiri Exorts	2	1.8 Lakhs
4	Reed and Pick	3	1.8 Lakhs
5	Elite Home Décor	1	1.9 Lakhs
6	C & R Textiles	1	1.8 Lakhs
7	Abhitex International	1	1.8 Lakhs
8	Raymond Pvt Ltd	1	2 Lakhs
9	Shingora Textiles Ltd	1	1.9 Lakhs

Placements for 2021-2022

S.No.	Name of the Company	Selected Candidates	Annual Package
1	Reid & Taylor, Mysuru	2	2.5 Lakhs
2	Centex Exports, Punjab	1	1.8 Lakhs
3	Himatsingka, Bangalore	3	3 Lakhs
4	Jivani Textiles, Gujarat	3	1.8 Lakhs
5	Elite Home Décor	1	1.9 Lakhs
6	C & R Textiles	1	1.8 Lakhs
7	HKV Benaras, Varanasi	1	1.8 Lakhs
8	K A Sons Exports, Agra	1	2 Lakhs
9	Manjeet Global Pvt Ltd, Indore	1	1.9 Lakhs
10	Arvind Ltd, Dholka, Gujarat	1	2 Lakhs

11	KTEX Nonwovens, Gujarat	1	2 Lakhs
12	Continental Home Furnishings, Delhi	4	2 Lakhs
13	Pasari Silk Industries, Kolkata	2	1.5 Lakhs
14	JVS, Varanasi	1	2 Lakhs

7. List of Research Projects/ Consultancy Works: - N/A

- Number of Project carried out ,Funding Agency, Grant received
- Publication (if any) out of research in last three years out of masters project
- Industry Linkage
- MoUs with industries (minimum 3(10))

8. LoA and subsequent EoA till the current academic year

All India Council for Technical Education
(A Statutory body under Ministry of Education, Govt. of India)
Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2022-23
Extension of Approval (EoA)

F.No. Northern/1-10976013056/2022/EOA   Date: 03-Jul-2022

To,

The Principal Secretary (Tech. Edu.)
Govt. of Uttar pradesh,
Sachiv Bhawan, Lucknow-226001,
12A, Navin Bhawan,
U.P. Lucknow-226001

Sub: Extension of Approval for the Academic Year 2022-23

Ref: Application of the Institution for Extension of Approval for the Academic Year 2022-23

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2022 Notified on 4th February, 2022 and amended on 24th February 2022 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to

Permanent Id	1-581901631	Application Id	1-10976013056
Name of the Institution	INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY, VARANASI	**Name of the Society/Trust**	THE DEVELOPMENT COMMISSIONER FOR HANDLOOMS
Institution Address	CHOWKAGHAT VARANASI - 221002 (UP), VARANASI, VARANASI, Uttar Pradesh, 221002	**Society/Trust Address**	MINISTRY OF TEXTILE UDYOG BHUVAN, NEW DELHI,DELHI,CENTRAL DELHI,Delhi,110011
Institution Type	Government	**Region**	Northern
Year of Establishment	1994		

To conduct following Courses with the Intake indicated below for the Academic Year 2022-23

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
DIPLOMA	ENGINEERING AND TECHNOLOGY	DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY	None	65	65	NA	NA
POST DIPLOMA	ENGINEERING AND TECHNOLOGY	TEXTILE PROCESSING	None	18	18	NA	NA

Level	Program	Course	Affiliating Body (University /Body)	Intake Approved for 2021-22	Intake Approved for 2022-23	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
UNDER GRADUATE	ENGINEERING AND TECHNOLOGY	HANDLOOM AND TEXTILE TECHNOLOGY	Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow	60	60	NA	NA

It is mandatory to comply with all the essential requirements as given in APH 2022-23 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC (NCL)/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time are now amalgamated as total intake and shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2022-23 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook. All such Institutions/ Universities shall have to create the necessary Faculty, Infrastructure and other facilities WITHIN 2 YEARS to fulfil the norms based on the Affidavit submitted to AICTE beginning with the Academic Year 2022-23

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as Approval Process Handbook and provisions made in AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Pharmacy Institute: In compliance with the order dated 05.03.2020 passed by the Hon'ble Supreme Court of India in Transferred Petitions (CIVIL) No 87-101 of 2014, for the existing institutions offering courses in Pharmacy Programme, approval of Pharmacy Council of India (PCI) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per the respective regulatory body (PCI).
In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by PCI, the approval of PCI shall prevail.

Architecture Institute: In compliance with the order dated 08.11.2019 passed by the Hon'ble Supreme Court of Indian CA No.364/ 2005, for the existing Institutions offering Courses in Architecture Programme, approval by the Council of Architecture (CoA) is mandatory and AICTE approval is NOT required. The requirements for running the Programme (Diploma / UG / PG) such as Land & Build-up Area, Student-faculty ratio, Intake etc. will be as per respective regulatory body (CoA). In case of any inconsistency in the course name and intake for EoA issued by AICTE and the approval by CoA, the approval of CoA shall prevail.

Deemed to be University: Institutions Deemed to be Universities (Running Technical Education Programmes), it is mandatory to have AICTE approval from the Academic Year 2018-19 in compliance of the Hon'ble Supreme Court Order dated 03-11-2017 passed in CA No.17869- 17870 /2017.

Application No:1-10976013056 **ALL INDIA COUNCIL FOR TECHNICAL EDUCATION** Page **2** of **3**
Note: This is a Computer generated Report. No signature is required.
Printed By : aic005353 Letter Printed On:14 July 2022

Prof.Rajive Kumar
Member Secretary, AICTE

Copy to:

1. **The Director Of Technical Education****, Uttar Pradesh

2. **The Registrar****,
   None

3. **The Principal / Director,**
   INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY, VARANASI
   Chowkaghat
   Varanasi - 221002
   (Up),
   Varanasi,Varanasi,
   Uttar Pradesh,221002

4. **The Secretary / Chairman,**
   MINISTRY OF TEXTILE UDYOG BHUVAN, NEW DELHI
   DELHI,CENTRAL DELHI
   Delhi,110011

5. **The Regional Officer,**
   All India Council for Technical Education
   Govt. Polytechnic Campus
   Adjoining Directorate of Technical Education
   Vikas Nagar, Kanpur-208 002, Uttar Pradesh

6. **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

Application No:1-10976013056   **ALL INDIA COUNCIL FOR TECHNICAL EDUCATION**   Page **3** of **3**
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Printed By : aic005353   Letter Printed On:14 July 2022

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All India Council for Technical Education
(A Statutory body under Ministry of Education, Govt. of India)
Nelson Mandela Marg,Vasant Kunj, New Delhi-110070 Website: www.aicte-india.org

APPROVAL PROCESS 2021-22
Extension of Approval (EoA)

F.No. Northern/1-9318889444/2021/EOA   Date: 25-Jun-2021

To,

The Principal Secretary (Tech. Edu.)
Govt. of Uttar pradesh,
Sachiv Bhawan, Lucknow-226001,
12A, Navin Bhawan,
U.P. Lucknow-226001

Sub: Extension of Approval for the Academic Year 2021-22

Ref: Application of the Institution for Extension of Approval for the Academic Year 2021-22

Sir/Madam,

In terms of the provisions under the All India Council for Technical Education (Grant of Approvals for Technical Institutions) Regulations, 2021 Notified on 4th February, 2020 and amended on 24th February 2021 and norms standards, procedures and conditions prescribed by the Council from time to time, I am directed to convey the approval to:

Permanent Id	1-581901631	Application Id	1-9318889444
Name of the Institution /University	INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY, VARANASI	Name of the Society/Trust	THE DEVELOPMENT COMMISSIONER FOR HANDLOOMS
Institution /University Address	CHOWKAGHAT VARANASI - 221002 (UP), VARANASI, VARANASI, Uttar Pradesh, 221002	Society/Trust Address	MINISTRY OF TEXTILE UDYOG BHUVAN, NEW DELHI,DELHI,CENTRAL DELHI,Delhi,110011
Institution /University Type	Government	Region	Northern

To conduct following Programs / Courses with the Intake indicated below for the Academic Year 2021-22

Program	Level	Course	Affiliating Body (University /Body)	Intake Approved for 2020-21	Intake Approved for 2021-22	NRI Approval Status	FN / Gulf quota/ OCI/ Approval Status
ENGINEERING AND TECHNOLOGY	DIPLOMA	DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY	None	65	65	NA	NA
ENGINEERING AND TECHNOLOGY	POST DIPLOMA	TEXTILE PROCESSING	None	18	18	NA	NA
ENGINEERING AND TECHNOLOGY	UNDER GRADUATE	HANDLOOM & TEXTILE TECHNOLOGY	Dr. A.P.J. Abdul Kalam Technical University, Uttar Pradesh, Lucknow	60	60	NA	NA

Application No:1-9318889444   **ALL INDIA COUNCIL FOR TECHNICAL EDUCATION**   Page **1** of **3**
Note: This is a Computer generated Report. No signature is required.
Printed By : aic005353   Letter Printed On:5 July 2021

It is mandatory to comply with all the essential requirements as given in APH 2021-22 (Appendix 6)

Important Instructions

1. The State Government/ UT/ Directorate of Technical Education/ Directorate of Medical Education shall ensure that 10% of reservation for Economically Weaker Section (EWS) as per the reservation policy for admission, operational from the Academic year 2019-20 is implemented without affecting the reservation percentages of SC/ ST/ OBC/ General. However, this would not be applicable in the case of Minority Institutions referred to the Clause (1) of Article 30 of Constitution of India. Such Institution shall be permitted to increase in annual permitted strength over a maximum period of two years.

2. The Institution offering courses earlier in the Regular Shift, First Shift, Second Shift/Part Time now amalgamated as total intake shall have to fulfil all facilities such as Infrastructure, Faculty and other requirements as per the norms specified in the Approval Process Handbook 2021-22 for the Total Approved Intake. Further, the Institutions Deemed to be Universities/ Institutions having Accreditation/ Autonomy status shall have to maintain the Faculty: Student ratio as specified in the Approval Process Handbook.

3. Strict compliance of Anti-Ragging Regulation, Establishment of Committee for SC/ ST, Establishment of Internal Complaint Committee (ICC), Establishment of Online Grievance Redressal Mechanism, Barrier Free Built Environment for disabled and elderly persons, Fire and Safety Certificate should be maintained as per the provisions made in Approval Process Handbook and AICTE Regulation notified from time to time.

4. In case of any differences in content in this Computer generated Extension of Approval Letter, the content/information as approved by the Executive Council / General Council as available on the record of AICTE shall be final and binding.

Prof.Rajive Kumar
Member Secretary, AICTE

Copy ** to:

1.   The Director of Technical Education, Uttar Pradesh**

2.   The Registrar,**
None

3.   The Principal / Director,
INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY, VARANASI
Chowkaghat
Varanasi - 221002
(Up),
Varanasi,Varanasi,
Uttar Pradesh,221002

4.   The Secretary / Chairman,
MINISTRY OF TEXTILE UDYOG BHUVAN, NEW DELHI
DELHI,CENTRAL DELHI
Delhi,110011

5.   The Regional Officer,
All India Council for Technical Education
Govt. Polytechnic Campus
Adjoining Directorate of Technical Education
Vikas Nagar, Kanpur-208 002, Uttar Pradesh

Application No:1-9318889444   ALL INDIA COUNCIL FOR TECHNICAL EDUCATION   Page **2** of **3**
Note: This is a Computer generated Report. No signature is required.
Printed By : aic005353   Letter Printed On:5 July 2021

6.   **Guard File(AICTE)**

Note: Validity of the Course details may be verified at http://www.aicte-india.org/ .

** Individual Approval letter copy will not be communicated through Post/Email. However, consolidated list of Approved Institutions(bulk) will be shared through official Email Address to the concerned Authorities mentioned above.

This is a computer generated Statement. No signature Required

9. Accounted audited statement for the last 3 year

10. Best practices adopted if Any.