

Scheme & Syllabus of
UNDERGRADUATE DEGREE COURSE

B.Tech. VII & VIII Semester

Textile Engineering



Rajasthan Technical University, Kota
Effective from session: 2020-21



RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Scheme & Syllabus

IV Year- VII & VIII Semester: B. Tech. (Textile Engineering)

Teaching & Examination Scheme

B.Tech. : Textile Engineering

4th Year – VII Semester

| THEORY | | | | | | | | | | | |
|-----------------------|------------|---------|-----------------------------------------------------------------|------------------|----------|----------|---------|------------|------------|------------|-----------|
| SN | Category | Course | | Contact hrs/week | | | Marks | | | Cr | |
| | | Code | Title | L | T | P | Exm Hrs | IA | ETE | | Total |
| | | | | | | | | | | | |
| 1 | PCC | 7TE4-01 | Multi Fibre Spinning | 3 | 0 | 0 | 3 | 30 | 70 | 100 | 3 |
| 2 | OE | | Open Elective I | 3 | 0 | 0 | 3 | 30 | 70 | 100 | 3 |
| | | | Sub Total | 6 | 0 | 0 | | 60 | 140 | 200 | 6 |
| PRACTICAL & SESSIONAL | | | | | | | | | | | |
| 3 | PCC | 7TE4-21 | Spinning Practical – V | 0 | 0 | 4 | 3 | 60 | 40 | 100 | 2 |
| 4 | | 7TE4-22 | Weaving Practical- V | 0 | 0 | 4 | 3 | 60 | 40 | 100 | 2 |
| 5 | PSIT | 7TE7-30 | Industrial Training | 1 | 0 | 0 | 3 | 60 | 40 | 100 | 2.5 |
| 6 | | 7TE7-40 | Seminar | 2 | 0 | 0 | 3 | 60 | 40 | 100 | 2 |
| 7 | SODE CA | 7TE8-00 | Social Outreach, Discipline & Extra Curricular Activities | | | | | | 100 | 100 | 0.5 |
| | | | Sub- Total | 3 | 0 | 8 | | 240 | 260 | 500 | 9 |
| | | | TOTAL OF VII SEMEESTER | 9 | 0 | 8 | | 300 | 400 | 700 | 15 |

L: Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

ETE: End Term Exam, **IA:** Internal Assessment



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B.Tech. : Textile Engineering

4th Year – VIII Semester

| THEORY | | | | | | | | | | | |
|-----------------------|------------|---------|-----------------------------------------------------------------|------------------|----------|----------|---------|------------|------------|------------|-------------|
| SN | Category | Course | | Contact hrs/week | | | Marks | | | | Cr |
| | | Code | Title | L | T | P | Exm Hrs | IA | ETE | Total | |
| | | | | | | | | | | | |
| 1 | PEC | 8TE5-11 | Modern Spinning Machines | 3 | 0 | 0 | 3 | 30 | 70 | 100 | 3 |
| 2 | | 8TE5-12 | Developments in Fabric Production | | | | | | | | |
| 3 | OE | | Open Elective II | 3 | 0 | 0 | 3 | 30 | 70 | 100 | 3 |
| | | | Sub Total | 6 | 0 | 0 | | 60 | 140 | 200 | 6 |
| PRACTICAL & SESSIONAL | | | | | | | | | | | |
| 4 | PCC | 8TE4-21 | Spinning Practical – VI | 0 | 0 | 2 | 2 | 60 | 40 | 100 | 1 |
| 5 | | 8TE4-22 | Weaving Practical- VI | 0 | 0 | 2 | 2 | 60 | 40 | 100 | 1 |
| 6 | PSIT | 8TE7-50 | Project | 3 | 0 | 0 | | 60 | 40 | 100 | 7 |
| 7 | SODE CA | 8TE8-00 | Social Outreach, Discipline & Extra Curricular Activities | 0 | 0 | 0 | | | 100 | 100 | 0.5 |
| | | | Sub- Total | 3 | 0 | 4 | | 180 | 220 | 400 | 9.5 |
| | | | TOTAL OF VIII SEMEESTER | 9 | 0 | 4 | | 240 | 360 | 600 | 15.5 |

L: Lecture, **T:** Tutorial, **P:** Practical, **Cr:** Credits

ETE: End Term Exam, **IA:** Internal Assessment



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B Tech (Textile Engineering) Honours

A student will be eligible to get **B Tech (Textile Engineering) (Honours)**, if he/she completes additional **20 credits**. These could be acquired through MOOCs.

B Tech (Textile Engineering) Honours

| S. No. | Category | Course Code | Course Title | Credits |
|--------------|----------|-------------|-----------------------------------------|-------------------------|
| 1 | MC | TE9-01 | NPTEL , IIT Madras, nptel.ac.in | As per credit of course |
| 2 | | TE9-02 | mooKIT, IIT Kanpur , www.mookit.co | As per credit of course |
| 3 | | TE9-03 | IITBX, IIT Bombay, iitbombayx.in | As per credit of course |
| 4 | | TE9-04 | SWAYAM, MHRD & Microsoft, swayam.gov.in | As per credit of course |
| Total | | | | 20 |



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| List of Open Electives for Textile Engineering | | | |
|-------------------------------------------------------|---------------------------------------------------|---------------------------|-----------------------------------------------------|
| Subject Code | Title | Subject Code | Title |
| Open Elective - I | | Open Elective - II | |
| 7AG6-60.1 | Human Engineering and Safety | 8AG6-60.1 | Energy Management |
| 7AG6-60.2 | Environmental Engineering and Disaster Management | 8AG6-60.2 | Waste and By-product Utilization |
| 7AN6-60.1 | Aircraft Avionic System | 8AN6-60.1 | Finite Element Methods |
| 7AN6-60.2 | Non-Destructive Testing | 8AN6-60.2 | Factor of Human Interactions |
| 7CH6-60.1 | Optimization Techniques | 8CH6-60.1 | Refinery Engineering Design |
| 7CH6-60.2 | Sustainable Engineering | 8CH6-60.2 | Fertilizer Technology |
| 7CR6-60.1 | Introduction to Ceramic Science & Technology | 8CR6-60.1 | Electrical and Electronic Ceramics |
| 7CR6-60.2 | Plant, Equipment and Furnace Design | 8CR6-60.2 | Biomaterials |
| 7CE6-60.1 | Environmental Impact Analysis | 8CE6-60.1 | Composite Materials |
| 7CE6-60.2 | Disaster Management | 8CE6-60.2 | Fire and Safety Engineering |
| 7CS6-60.1 | Quality Management/ISO 9000 | 8CS6-60.1 | Big Data Analytics |
| 7CS6-60.2 | Cyber Security | 8CS6-60.2 | IPR, Copyright and Cyber Law of India |
| 7EE6-60.1 | Electrical Machines and Drives | 8EE6-60.1 | Energy Audit and Demand side Management |
| 7EE6-60.2 | Power Generation Sources. | 8EE6-60.2 | Soft Computing |
| 7EC6-60.1 | Principle of Electronic communication | 8EC6-60.1 | Industrial and Biomedical applications of RF Energy |
| 7EC6-60.2 | Micro and Smart System Technology | 8EC6-60.2 | Robotics and control |
| 7ME6-60.1 | Finite Element Analysis | 8ME6-60.1 | Operations Research |
| 7ME6-60.2 | Quality Management | 8ME6-60.2 | Simulation Modeling and Analysis |
| 7MI6-60.1 | Rock Engineering | 8MI6-60.1 | Experimental Stress Analysis |
| 7MI6-60.2 | Mineral Processing | 8MI6-60.2 | Maintenance Management |
| 7PE6-60.1 | Pipeline Engineering | 8PE6-60.1 | Unconventional Hydrocarbon Resources |
| 7PE6-60.2 | Water Pollution control Engineering | 8PE6-60.2 | Energy Management & Policy |



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7TE4-01: MULTI FIBRE SPINNING

Credit: 3

3L+0T+0P

Max. Marks: 100(IA:30, ETE:70)

End Term Exam: 3 Hours

| SN | Contents | Hours |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 1 | Introduction: Objective, scope and outcome of the course. | 1 |
| 2 | Survey of established practices for the spinning of manmade fibres using different spinning systems with emphasis of fiber and yarn properties | 8 |
| 3 | Detailed study of the cotton system process for spinning of man-made fibres and fibre assemblies Properties involving engineering principles | 9 |
| 4 | Blending techniques for various man-made and natural fibres, problems in Blending Blended yarn properties and fabric performance Introduction of Sericulture- Mulberry, Tassar and Eri silk, Properties of silk and Silk spinning Spinning of wool (woolen and worsted system.) | 9 |
| 5 | Cotton Waste: Types, classification and end-uses Study of machines and methods employed in the production of waste yarns(coiled system and condenser system).Recycled Fiber | 9 |
| 6 | Introduction to jute and linen spinning process. | 4 |
| | Total | 40 |



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7TE4-21 SPINNING PRACTICAL -V

Credit: 2
OL+OT+4P

Max. Marks: 100(IA:60, ETE:40)
End Term Exam: 3 Hours

Contents

Spinning Practical Familiarity with established processing parameters for producing carded combed, blended, folded and fancy yarns.
Practice in handling, operating, setting and gauging Rotor Spining frame, Air- Jet Spinning and friction spinning

7TE4-22 WEAVING PRACTICAL -V

Credit: 2
OL+OT+4P

Max. Marks: 100(IA:60, ETE:40)
End Term Exam: 3 Hours

Contents

Mechanism of secondary, auxiliary motions and beam gaiting of projectile weaving and Air-Jet machines.. Study of constructional details of tape loom. Practice in weaving and knitting and checking the quality of fancy fabric and method of rectifying the defect.
Light theory, Pigment theory, Complementary colors, Chromatic circle, Brewster circle, coloured grey.



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7TE7-30 INDUSTRIAL TRAINING

Credit: 2.5

1L+0T+0P

Max. Marks: 100(IA:60, ETE:40)

End Term Exam: 3 Hours

Contents

Each student, individual or in association with some other students at the end of the Third B.TECH. course will observe and collect the general and technical information pertaining to machinery, raw materials used, yarns and fabrics produced by the textile mills, in which he/she/they are undertaking 8 weeks' practical training. Each student will have to submit a written/typed report duly approved and signed by the guide to the Head of the Department.

7TE7-40 SEMINAR

Credit: 2

2L+0T+0P

Max. Marks: 100(IA:60, ETE:40)

End Term Exam: 3 Hours

Contents

Topic - In the beginning of the semester, every student of the class will be assigned a seminar topic in the emerging / perspective field in the area of textiles such as Spinning, Weaving, Fibres, Testing, Chemical processing and alike. Seminar should be based on the literature survey on any topic of textiles. Seminar Preparation and Presentation – Student will collect the information on the above subjects and submit the report. The seminar report will be of minimum 15 pages and maximum 25 pages. The spacing between the lines will be 1.5. The font size will be 12 point Times New Roman. The list of reference must be given at the end of seminar report as prescribed on RTU Website. The student has to present seminar in front of the faculty member of the department of textile technology and his/her classmates. The faculty member, based on the quality of the work and preparation and understanding of the candidate, shall do an assessment of the seminar internally.

7TE8-00: SOCIAL OUTREACH, DISCIPLINE & EXTRA CURRICULAR ACTIVITIES

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Rajasthan Technical University, Kota



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STE5-11: MODERN SPINNING MACHINES

Credit: 3

3L+0T+2P

Max. Marks: 100(IA:30, ETE:70)

End Term Exam: 3 Hours

| SN | Contents | Hours |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1 | Introduction: Objective, scope and outcome of the course. | 1 |
| 2 | Causes leading to the advent of unconventional systems of spinning Classification of unconventional methods of yarn production | 7 |
| 3 | Mechanism of yarn formation on rotor spinning Effect of rotor machine variables and fibre properties on the properties of rotor spun yarns Limitation of rotor spinning Advances in rotor spinning | 12 |
| 4 | Study of other open-end spinning systems Friction spinning Electrostatic spinning | 6 |
| 5 | Air-vortex spinning Mechanism of yarn formation Structure, properties and end uses of yarns spun on Air-jet spinning | 6 |
| 6 | Principle of wrap spinning Twist less spinning Self-twist spinning Compact spinning Ring spinning Structure, properties and end uses of these yarns Potential and limitations of various spinning technologies | 8 |
| | | 40 |



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STE5-12: DEVELOPMENTS IN FABRIC PRODUCTION

Credit: 3

Max. Marks: 100(IA:30, ETE:70)

3L+0T+2P

End Term Exam: 3 Hours

| SN | Contents | Hours |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1 | Introduction: Objective, scope and outcome of the course. | 1 |
| 2 | Narrow Fabric Weaving : Introduction, Scope of narrow fabric weaving, applications Preparation – Machines and processes for assembling warps, various warping processes, weft preparation. Industrial fabrics especially kind of canvases, Belts, Parachute Fabrics and umbrella cloth. Lycra Fabric Narrow fabrics production methods and their calculation: Laces, bandage, ribbons and niwar | 7 |
| 3 | Technology of narrow fabric weaving – Machine construction, Shuttle looms, needle looms, warp feed systems from beams, creel for elastomeric yarns, shedding by cam and links, pattern chain preparation for different weaves, weft insertion systems(needle loom) , various selvedge forming systems on needle loom, drives to different elements, take up. Application of weaves in narrow fabric weaving. | 10 |
| 4 | Manufacture of Labels: Applications, labels with woven selvedge and cut selvedge. Printed labels, fabric specifications, specifications of jacquard used, feed material specifications. Braiding: Introduction, classification (rounds and flat braids), applications, raw material used for braids, machines used for braiding (drive, yarn supply, Braiding technology, take up. Gauge and leno structure with their mechanism. Madras Muslin structures | 8 |
| 5 | Type of Carpets and classification , Hand knitted carpets, tufted Carpets, Knitted Carpets, Stitch Bonded Carpets, Electrostatic flocking Carpets. Some common fabrics like Lappets, Swivels, Ondule Fabrics, Tuck fabrics, woven pile fabrics produced by thermal shrinkage. | 8 |



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| | | |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 6 | Non-woven fabrics Historical background of nonwovens, non woven definition, stages in Nonwoven manufacturing Web Forming Techniques: carding, Garnetting, air laid, wet process, polymer extrusion. Classification of nonwoven – On the basis of use, on the basis of manufacturing process, on the basis of web formation, on the basis of bonding. Dry laid webs – fibre selection, fibre preparation, web formation, layering, Wet laid nonwoven – Raw materials, production process, special features of the wet laid process and its product. Spun laced webs Mechanically bonded webs – needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications. Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications. Chemically bonded nonwoven – Latex binder, other types of nonwoven binders, formulation, order of formulation, bonding technology – saturation, foam bonding, spray bonding, print bonding, powder bonding, application of chemical bonded nonwovens. Thermally bonded nonwovens – binder, binding fibres, binding powder, binding webs, methods of thermal bonding – Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding. Melt blown nonwovens | 6 |
| | Total | 40 |



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8TE4-21: SPINNING PRACTICAL -VI

Credit: 1
OL+OT+2P

Max. Marks: 100(IA:60, ETE:40)
End Term Exam: 2 Hours

Contents

Collection and interpretation of data for process control in Blowroom, card, drawframe, simplex, ringframe and TFO and comparing the same with established norms.
Study of the defects at various stages of spinning

8TE4-22: WEAVING PRACTICAL -VI

Credit: 1
OL+OT+2P

Max. Marks: 100(IA:60, ETE:40)
End Term Exam: 2 Hours

Contents

Familiarity with the temperature and humidity in different department and methods of controlling the same. Oiling and maintenance schedules. Work load assignments in different department. Familiarity with established processing parameters for weaving. Stoppage and Snap studies.
Practice on dobby & jacquard based weaving designs software's Preparation of draft, designs and peg plans for various types of designs. Practice on printing software, color separation, screen preparation. Use of scanners.



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STE7-50: PROJECT

Credit: 7
3L+0T+0P

Max. Marks: 100(IA:60, ETE:40)
End Term Exam: 4 Hours

Contents

Each Student individually, or in association with some other students will carry out project of an experimental and/ or theoretical nature in one of the main branches textile technology and present him fin ding is a systematic in the report form duty approved and signed by his supervisors/Guide(to be nominated by the Head of the Departments/Institutes).Each candidates would submit 3 typed copies of project report to the head of the department/institution at least 15 days before the commencement of second semester examination after viva-voce examinations. The original report and a carbon copy will be retained by the concerned department/institution and the supervisor respectively.

STE8-00: SOCIAL OUTREACH, DISCIPLINE & EXTRA CURRICULAR ACTIVITIES