Access to Masters Offline Module

# MSc Textile Engineering

Use this worksheet to rate your abilities to find out if this Masters programme is suitable for you.

# Instructions

1. Graph 1 is the profile of a student who is suited to this subject.
2. Circle the statement that you feel best represents you on each of the 12 abilities below.
3. Plot your profile on Graph 2 and compare this with the suitable entry profile.
4. If your scores fall below the suitable entry profile, access the learning materials embedded in this document.
5. After working through the learning materials repeat steps 1 and 2 and compare your profile with the suitable entry profile.
6. If it is a match then you should apply for a place on the programme.



Your Profile

Suitable Profile

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| Ability 1 Linear Algebra |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "LINEAR ALGEBRA" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague, I have heard of matrices. I can add them but multiplication is unclear. |
| **2** | I have basic knowledge of complex numbers in rectangular form and I can solve small system of equations with two unknowns. I can identify and calculate determinants of order two by two but no larger. |
| **3** | I can use different methods for solving linear equation systems, including inverse matrix, Cramer’s Rule and in particular, I am proficient in writing the augmented matrix to reduced row form. |
| **4** | I can use complex numbers in connection with solving higher order polynomial equations. I know about vectors, I can make statements about linear dependence/independence orthogonality and I am familiar with the Gram-Schmidt method. |
| **5** | I can solve applied problems e.g. dynamical systems formulated in plain English with the aid of eigenvalues. I can also solve least square problems formulated in a practical context. |

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| Ability 2 Statistics |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "STATISTICS" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague.  I don’t know much about statistics and the basic concepts of probability. |
| **2** | I have basic knowledge of statistics, probability, concepts of mean and variance and central limit theorem. |
| **3** | I can use different statistical methods if the method is provided. |
| **4** | I can use different statistical methods e.g. confidence interval, hypothesis test, linear regression analysis on standard data set. |
| **5** | I can use confidence interval, hypothesis test and linear regression analysis on different datasets. I understand how the different methods can be used and not used. |

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| Ability 3 Organic Chemistry |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "ORGANIC CHEMISTRY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | I know there are chemical substances and that some are organic. I’ve never heard of intermolecular interactions or chemical bonding. I know that textiles can be dyed but not how it is done. |
| **2** | I know a little about the concepts of concentration, pH and chemical reactions. Molecules interact with each other and that these interactions influence many physical properties. I know something about the textile processes but I am not able to describe what occurs chemically. |
| **3** | I can handle basic chemical calculations (e.g. mass to number of molecules, number of molecules to concentration) and practical exercises (e.g. making a solution, performing a titration). I know that hydrogen bonding and dispersion forces are examples of intermolecular interactions. I know the origin of the differences in boiling point, melting point hydrophilicity and hydrophobicity of different substances and materials.   |
| **4** | I know what entropy, enthalpy and Gibbs free energy are, and a little about how these entities are related to chemical and physical reactions and processes. I am familiar with the terms surface tension, colloids, amphoteric molecules and micelles. I am aware of the principal chemical processes that occur during common textile finishing processes. I can relate some chemical moieties to environmental issues.    |
| **5** | I can discuss and relate textile finishing processes with the molecular structure of the fibre and finishing agent. I am comfortable in and I know my way around a lab. I am aware of and know the origin of the environmental issues and challenges that the textile industries are facing. I can set up chemical reaction formulas and perform calculations with the reaction formula as a starting point. I can describe the different types of intra and intermolecular interactions that can exist. |

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| Ability 4 Textile Chemistry |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "TEXTILE CHEMISTRY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. There must be some process that fixes the colour, creates a print or makes my jacket waterproof. |
| **2** | I know that textiles are dyed and treated with a lot of chemicals, water and energy which also are related to environmental issues. |
| **3** | I know that fibres have to be dyed and printed with different types of dye classes and under different conditions. Pre-treatment is a necessity for most fibres and natural fibres in particular. |
| **4** | I can explain how the selection of chemicals, mechanical processing and temperature has a crucial impact on properties and performance of a textile, with different result depending on fibre. |
| **5** | I can easily set up a suggestion for a process chart on a textile product in order to fulfil a product specification. I know when and how to process and I also know what parameters are important to have under control. |

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| Ability 5 Fibre Technology |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "FIBRE TECHNOLOGY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. I only know that fibres are used in textile materials somehow. |
| **2** | I understand that textile fibres are divided into natural fibres and man-made fibres and these can be used to make knitted, woven and non-woven materials. |
| **3** | I fully understand how regenerated and synthetic fibres are made and their polymeric composition. |
| **4** | I can easily identify textile fibres viewed under the microscope, through a burning and/or a solubility test. I can explain the morphology, mechanical and chemical properties of textile fibres. |
| **5** | I can simply identify an unknown textile material on the structure, yarn and fibre level. |

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| Ability 6 Polymers |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "POLYMERS" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. I don’t know much more than that there is a group of materials called plastics. |
| **2** | Synthetic fibres such as polyester, nylon and acrylic are made up of something called polymers. These polymers can be defined by their repeating unit, which governs their physical and chemical properties. |
| **3** | The polymers can be linear, branched, cross-linked (permanently or thermally reversibly), thermoplastic, and thermosetting or call for a solvent to be deformed. There are both amorphous and semi-crystalline polymers. I know the difference between polymers and plastics. I now that glass transition, crystallization and melting temperatures govern the processing and usage constraints of a certain polymer. |
| **4** | I know the constitution, configuration and conformational mobility that makes a polymer a candidate for synthetic fibres. I know what controls the glass transition temperature both structural and configurational factors such as tacticity. I also realise how crystallization and melting temperatures govern the processing and usage constraints of a certain polymer. There are sustainability issues with some polymers. |
| **5** | I can draw a number of repeating units, also for some high-performance polymers and can discuss what in their molecular architecture that makes them high-performance, and how and why they were polymerised according to certain specific routes. I know approximate glass transition and melting temperatures for a number of commodity thermoplastics, what additives that are used for each plastic and how they are compounded and melt processed. How to problematise polymeric materials environmental issues is clear to me. |

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| Ability 7 Weaving Technology |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "WEAVING TECHNOLOGY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. I don’t know more than woven materials are used for clothes. |
| **2** | I know woven materials can be made by hand or by machines. Woven materials are made by interlacing the warp and weft yarn. I know the weave construction, i.e. different parameters such as width, length, weight, reed numbers etc. for a weave setup. |
| **3** | I know the principles of weaving machines including the yarn requirements (yarn twist and yarn numbers), weaving preparation, loom timing and weaving machines (loom). I have essential knowledge to manage the processes of weaving’s preparation (how to set up a warp) and forming fabrics on looms. |
| **4** | I am familiar with names like plain, basket, satin, twill as weave patterns. I have knowledge about the variations of basic weaves. I am aware of the basic structure of both 2D and 3D-weaves. |
| **5** | I know the main difference between a dobby and Jacquard loom. I know CAD/CAM software program for dobby and Jacquard weaving. |

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| Ability 8 Knitting Technology |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "KNITTING TECHNOLOGY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. I know that there are different seams in different types of textile products. |
| **2** | Knitted materials can be made by hand or by machines. Knitted materials are made of loops and can be used in a variety of products. |
| **3** | Knitted structures can be divided into two main groups, weft knitting and warp knitting and I know the difference between the two groups. I also know that weft knitting machines are divided into flat knitting machines and circular knitting machines. I also know that one main advantage with knitted materials is their stretchability. |
| **4** | I know the basic structures of both weft and warp knitting. Names like single jersey, full rib, half Milano, full Milano rib and 1:3-2 thread fleecy fabric are familiar to me. In warp knitting, I know the basic structures like pillar, 1x1 lapping 2x1 lapping, satin lap, atlas. I know the advantage with warp knitted structures in technical textiles. |
| **5** | I can construct structure combinations in both warp and weft knitting for a given product where the properties are known. I am also familiar with flat knitting and the complete garment technology. In warp knitting, I know the function of weft insertion and multi-axial structures in the area of technical structures and products. |

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| Ability 9 Clothing Technology |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "CLOTHING TECHNOLOGY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | Very vague. I know that there are different seams in different types of textile products. |
| **2** | I know some things about pattern construction and the way this affect the final outcome of a textile product. |
| **3** | I can identify the equipment needs on the basis of a textile production specification. I’m familiar with the systems of Quality Management in textiles and how to apply methods of applying quality. |
| **4** | I have a good knowledge of concepts as calculating production cost and how CAD/CAM equipment is used in the product development and production. I’m capable of identifying and analysing the problems in a production chain and making suggestions on how to solve these. |
| **5** | I can discuss and relate production processes with the total value-chain in the life circle of a textile product. I am able to analyse a production unit and understand how it could change to more efficiently match my demand of production. I can describe the complexity of how the different aspects of the production influence the quality level of the performance of the textile product. |

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| Ability 10 Textile Value Chain and Sustainability |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "TEXTILE VALUE CHAIN AND SUSTAINABILITY" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | I realise that there are environmental issues relating to textiles but it cannot be all that bad. |
| **2** | I realise that the textile industry, run by the ever increasing middle-class demand for fast fashion, is a major environmental concern. The design process, dictating processes and material selection, sets the conditions for ecological footprints and recyclability. The fragmented textile value chains are an inherent complexion to sustainability. |
| **3** | I realise that the textile industry, run by the ever increasing middle-class demand for fast fashion, is a big environmental concern. The design process, involving materials election, choice of process, conditions, additives, chemicals sets the conditions for ecological footprints and recyclability. I acknowledge the complexity and difficulty to control the textile value chain and the sustainability challenges they mean. |
| **4** | I’m aware of the ecological footprint posed by textiles and also about the growing demand for textiles. Fast fashion is a significant driving force. Taskholders with sustainability agendas have to face upstream and downstream issues relating to the lack of transparency and traceability associated with the global textile value chains. I’m familiar with Corporate Social Responsibility, CSR, and its conduct rules. I acknowledge the dilemma that longevity also means persistence of materials and may also pose health threats to textile workers. |
| **5** | I’m perfectly aware of the ecological footprint posed by textiles and also about the rapidly growing demand for textiles. Fast fashion has to end. Taskholders with sustainability agendas have to face upstream and downstream issues relating to the lack of transparency and traceability associated with the textile value chain global nature and complexity. I acknowledge sustainable development in every sense of the concept and I’m well acquainted with Corporate Social Responsibility, CSR, and the conduct rules that honour labour conditions. I see the dilemma that longevity also means persistence of materials. Means to reach durability often involve processes and material combinations that pose health issues for workers and seriously compromise recycling opportunities. |

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| Ability 11 Engineering Skills, Product Development and Problem Shooting |
| I would like to characterize my knowledge, understanding, skills, abilities, judgement and approach in "ENGINEERING SKILLS, PRODUCT DEVELOPMENT AND PROBLEM SHOOTING" as: | **0** | I have no understanding or knowledge of this ability. |
| **1** | I have a rather vague idea about the strength of materials and textile mechanics for woven and knitted structures. Sewing is the way to join different pieces of textile. I know that waterproof is a common term in outdoor wear but I don’t know how to accomplish it. |
| **2** | I know that there is some method to analyse inherent forces that act within material/textile construction and I know that textile constructions behave differently intension compared to compression. Sewing is the way to join fabrics. Textiles may be functionalised in order to alter their properties. It’s good to relate expected performance to the requirement in some way. |
| **3** | I recollect that there is a concept called free-body diagrams but I wouldn’t be able to utilise it in a product design process. I’m also perfectly aware that different constructions behave differently in tension and compression. There are feasible alternative textiles joining processes to sewing. Textiles humidity management ability can be altered by a large array of finishing technologies and it’s good to relate expected performance to articulated requirement in some way. |
| **4** | I have the basic understanding of how to utilise free-body diagrams to model simplified textile engineering problems. I also have a good idea how different constructions with their different yarns deform under tension and compression. I know that gluing and welding are two feasible textile joining options besides sewing and also what can be accomplished by functionalisation. All these tools aim at making viable textile products and to verify their requirements by test methods. |
| **5** | I know how to analyse a given textile engineering problem using free-body diagrams, textile mechanics and strength. I’m also perfectly aware how different constructions behave under tension and compression. This goes all the way from material to fibre, yarn via fabric or non-woven to ready-made and joined device or garment. I also know a lot about textile joining techniques, for various material combinations, besides sewing and what can be accomplished by textile functionalization, all with the intention to formulate and verify fulfilment of requirement specifications in the design process. |

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| Ability 12 Scientific Communication |
| Ability Statement | **0** | I have no understanding or knowledge of this ability. |
| **1** | I’ve had very limited training on how to make oral presentations and I’ve never had a chance to gain experience to exercise it in a scientific context. Hence, I would hesitate to do it today. I’m far from proud of my Bachelor’s thesis quality. I never learnt how to connect it to current literature. There was no way I could explain to the non-initiated what it was about and fortunately, no peer ever had the chance to review it. |
| **2** | I’ve had some training on how to make oral presentations and I think I know why some lecturers’ PowerPoints were easier to grasp during my Bachelor’s. Still I haven’t used it myself or have only touched it. My Bachelor’s thesis never drew much attention neither among peers nor professionals. I think it would have been difficult to explain its content and implications to society. |
| **3** | I know the basics on how to make an oral and visual (PowerPoint) presentation in a scientific context and I believe I would manage but it would take quite some preparation.  My Bachelor’s thesis was appreciated among peers and professionals, and I think I would manage to explain its content and implications to lay men. I believe peer review has many benefits. |
| **4** | I usually feel comfortable to present my work and attract the attention from an audience also with rather advanced textile technology topics. I know how to write a scientific report with solid links to relevant literature. I’ve experienced the power of peer review – giving, receiving and implementing it. |
| **5** | I feel comfortable to present my own work and that of colleagues, both orally and in a lecturing situation. I can communicate advanced textile technology topics to a mixed audience. I am confident that I can write scientific reports and popular texts that address the audiences of scholars, peers, industry representatives and laymen. I feel humble yet confident about scrutiny from peers and I love digging into someone else’s writing and have a discussion on it. |

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| Here are the Learning resources for Textile Engineering, use these to enhance your ability to be successful on this master’s programme. |  |