



## dark matter composites ltd

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|-----------------------|---|
| <b>Course Title:</b>  | <b>Composites for Engineers &amp; Designers, Stage 1 - Materials &amp; Processes</b>  |
| <b>Course Code:</b>   | <b>DMSC61</b>   |
| <b>Course Fees:</b>   | £1,250.00 course fee plus £250.00 UK VAT (£1,500.00 per delegate)   |
| <b>Structure:</b>     | 60% theory, 40% practical, 12 delegates maximum, no experience required   |
| <b>Pre-requisite:</b> | This is a high end course and delegates will need to have a sound technical background in materials, engineering or design, or have relevant experience |

### Summary

This is our most intensive and in-depth course covering current composite materials and processes. It provides an insight into working with composite materials, their limitations and compromises. The sessions are informative, interactive and thought provoking, bridging the gap between practice and theory. The key focus is on component design principles, production considerations and controls, to form an intuitive and creative approach to composite engineering.

### Course Content

|           | 09:00 – 11:00  | 11:15 – 13:15  | 13:45 – 15:45  | 16:00 – 18:00   |
|-----------|--|--|--|---|
| Monday    | <u>Introduction</u><br><br><u>Equipment issue</u><br><br><u>Health &amp; Safety</u><br>Measures & Legislation<br><br><u>Theory &amp; Discussion</u><br>Composites history<br>Composites theory | <u>Theory &amp; Discussion</u><br>Matrix materials<br>Reinforcing materials<br>Fabric types<br>Laminate theory and ply orientation<br><br>Lay-up specifications                              | <u>Theory &amp; Discussion</u><br>Sandwich structures<br>Core materials<br>Processing composite materials<br><br><u>Theory &amp; Practical</u><br>Tooling care and preparation<br>Release agents | <u>Theory &amp; Guided Practical</u><br><br>Wet lay up laminating<br>Design a laminate to suit a load requirement<br>Production of a wet lay-up part including calculations, gel coat & laminate application          |
| Tuesday   | <u>Theory</u><br>Resin flow & film infusion laminating<br>External & internal media with vacuum bagged & closed moulding<br><br><u>Demo &amp; Practical</u><br>Trial panels & evaluation       | <u>Theory &amp; Discussion</u><br>Vacuum bagging<br>Bagging materials & methods<br>Leak detection<br><br><u>Guided Practical</u><br>Design of distribution media for resin flow infused part | <u>Guided Practical</u><br>Gel coating, application of fabrics, external distribution and infusion media, surface vacuum bagging and leak detection of resin flow infusion part                  | <u>Practical &amp; Discussion</u><br>Resin calculations<br>Predicting flow fronts & infusion times<br>Final resin flow infusion and evaluation of parts<br><br><u>Demonstration</u><br>Resin film infusion laminating |
| Wednesday | <u>Theory, Demo &amp; Guided Practical</u><br>Pre-preg laminating<br>Material templating, ply orientation, nesting & kitting<br><br>Design a laminate to suit a load requirement               | <u>Theory</u><br>Processing & preparation of core materials<br><br><u>Guided Practical</u><br>Pre-preg laminating of part with sandwich structure  | <u>Demo &amp; Practical</u><br>Envelope vacuum bag & cure pre-preg part<br><br><u>Theory</u><br>Matrix curing & post-curing, temperature & pressure profiles<br>Tg points                        | <u>Theory &amp; Videos</u><br>Resin transfer moulding<br>Hot press moulding<br>Filament winding<br>Pultrusion<br>Automated tape laying & fibre placement  |
| Thursday  | <u>Theory &amp; Discussion</u><br>Causes of and identifying defects<br>Manual & NDT inspection<br>Production & quality controls<br>In-service monitoring                                       | <u>Theory, Demos &amp; Practical</u><br>Breakout parts produced<br>Trimming & finishing composites   | <u>Theory &amp; discussion</u><br>Adhesion & bonding methods<br><br><u>Theory &amp; Demos</u><br>Failure modes<br>Re-work & repair principles<br>Repair techniques                               | <u>Guided Practical</u><br>GRP and pre-preg repairs including removal of damage, preparation of the repair surface & laminating of repairs<br><br><u>Reinstate Workshop</u>   |
| Friday    | <u>Theory &amp; Discussion</u><br>Tooling and component design principles, types materials & life<br>Re-cycling & environmental issues   | <u>Practical &amp; Discussion</u><br>Case studies for tooling and component designs & problem solving  | <u>Theory &amp; Discussion</u><br>Laminate calculations<br>Finite element analysis<br>Testing composites<br>On-line resources  | <u>Written test (1hour)</u><br><br><u>Equipment return</u><br><br><u>Summary / Feedback</u>   |



**dark matter composites Ltd**

## *Composite Course Schedule 2019-20*

We provide the most comprehensive range of composite training courses available. Delegates regularly attend our courses from all industry sectors worldwide which are suitable for individuals and small companies through to tier one suppliers and OEMs.

We are continually involved in training industry personnel for the next generation of composite parts. Our courses are recognised as demanding, rewarding and representative of current best practice and processes and are continually updated. Our tutors are industry experts and our facilities set the standards for best practice and are specifically designed for delivery of composite training courses.

| <b>Course Code</b> | <b>Title</b>  | <b>Price per Delegate<br/>(incl. 20% UK VAT)</b> | <b>Course Dates</b>                                |
|--------------------|---|--|--|
| DMSC50             | Introduction to Composite Materials & Processes                         | £1,500.00  | 1-5 Jun 2020                                       |
| DMSC51             | Wet Lay-Up Laminating   | £1,500.00  | 6-10 Jul 2020                                      |
| DMSC52             | Spray Lay-Up Laminating   | £1,500.00  | 13-17 Jul 2020                                     |
| DMSC53             | Resin Infusion Laminating & Light RTM                                   | £1,500.00  | 11-15 May 2020                                     |
| DMSC54             | Pre-Preg Laminating – Stage 1   | £1,500.00  | 14-18 Oct 2019<br>24-28 Feb 2020<br>12-16 Oct 2020 |
| DMSC55             | Pre-Preg Laminating – Stage 2   | £1,500.00  | 21-25 Oct 2019<br>19-23 Oct 2020                   |
| DMSC56             | Pre-Preg Mould Making   | £1,740.00  | 5-9 Oct 2020                                       |
| DMSC57             | Trimming, Finishing & Assembly of Composites                            | £1,740.00  | 15-19 Jun 2020                                     |
| DMSC58             | Composite Repair – Stage 1  | £1,740.00  | 18-22 Nov 2019<br>16-20 Mar 2020<br>16-20 Nov 2020 |
| DMSC59             | Composite Repair – Stage 2  | £1,740.00  | 25-29 Nov 2019<br>23-27 Mar 2020<br>23-27 Nov 2020 |
| DMSC60             | Producing Your Own Composite Parts                                      | £1,500.00  | 27 Apr – 1 May 2020                                |
| DMSC61             | Composites for Engineers & Designers<br>Stage 1 - Materials & Processes | £1,500.00  | 3-7 Feb 2020<br>7-11 Sep 2020                      |
| DMSC62             | Composites for Engineers & Designers<br>Stage 2 - Advanced Design       | £1,500.00  | 14-18 Sep 2020                                     |

### **Bespoke Training Courses**

If you cannot find a course to suit your needs, bespoke courses can also be provided for individuals through to full company training programmes, worldwide at the customers' own facilities or at our premises. Pricing is dependent on location, delegates and course content. Please contact us to discuss your needs.

t/f +44 (0)1582 791001 [www.darkmattercomposites.com](http://www.darkmattercomposites.com)

Unit 8 Redbourn Industrial Estate, High Street, Redbourn, Hertfordshire, AL3 7LG, UK

Registered in England & Wales No: 5395870



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## ***Composite Course Information***

### **Entry Requirements**

No qualifications or previous experience is required unless otherwise stated on the specific course information sheet. If you are unsure please contact us.

### **Enrolments**

- Enrolments are taken on a first come, first served basis. We require either an on-line booking or a completed enrolment form and full payment.
- On receipt of your booking/enrolment form, we will process your payment if there are places available on the course and issue a full course confirmation.
- If the course is full, your payment will not be processed and you will be advised accordingly.
- Please note that we do not take provisional bookings or hold any places. Course confirmations are only sent if places are available and full payment has been received into our account.

### **Payment**

We accept the following forms of payment and can provide companies with pro-forma invoices where required:

- Credit and Debit cards including Mastercard, Visa, Maestro, Solo and American Express
- Personal or Company cheques payable to 'Dark Matter Composites Ltd'
- Paypal
- BACS, CHAPS or IBAN bank transfers

### **Course Fees**

- The fees are stated on the individual course information sheets and are per delegate per course.
- Course fees stated are in pounds sterling and are subject to UK VAT at the current rate (20%).
- EU companies can reclaim VAT through their local VAT system. Non EU delegates cannot reclaim the VAT as the course is a service provided in the UK and not an exported product.
- The fees stated are valid until 31<sup>st</sup> December 2019.
- All fees stated include: provision of all materials, tools, equipment and protective clothing (except footwear, see below); lunch, tea & coffee for each day of the course; and course handouts.
- All course fees must be paid prior to the start of the course.
- Items produced by delegates can be taken away at the end of the course.

### **Location**

Our courses are run at our dedicated training facilities in Redbourn, Hertfordshire, United Kingdom. We are close to London with good travel links to Central London and all London Airports, with London Luton Airport just 8 miles away. There are good transport links to the M1/M25 motorways and train links at the local towns of Hemel Hempstead, St Albans, Harpenden and Luton.

### **Times & Attendance**

Each day starts promptly at 9am and finishes at approximately 6pm, Monday to Friday.

### **Clothing, tools and equipment**

- Delegates must wear full-length trousers and closed leather shoes or safety boots (no trainers) during the course.
- All other tools, equipment and personal protective equipment are included in the course fee.

### **Course Assessment**

Assessment activities are built into our courses, to give feedback on the achievement and potential of delegates. Delegates are assessed on their attendance, quality of practical work completed and a written test. Assessment marks are printed on the course certificates and kept on record.

### **Exclusions**

Travel, accommodation and general sustenance expenses incurred by delegates are excluded from the course prices (except where otherwise stated).

### **Accommodation**

Please note that we have an accommodation list that is available on our website or upon request.



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COURSE ENROLMENT FORM

Please complete the form in BLOCK letters

Course Code, Course Title, Course Date, Course Fee
Where did you find out about the course?

Personal Details

Title, First Name, Surname, Date of Birth
Address, Postcode
Telephone No., Mobile No., Email
Do you have any special dietary requirements or special needs? Yes / No
If 'Yes' please give details:

Employer or Emergency Contact Details

Company and/or Contact Name, Telephone No.
Address, Postcode

I confirm that I agree to the 'Course Enrolment Conditions' and that the information given above is correct. For applicants under 18 years old at the start of the course, I also confirm that I am a parent/legal guardian/employer (please delete as appropriate) of the applicant and give my consent for them to attend the course.

Name Signature Date

Payment

- Personal/Company cheque enclosed, payable to 'Dark Matter Composites Ltd'
UK Bank Transfer (payment details shall be provided upon enrolment receipt)
International Bank Transfer (payment details shall be provided upon enrolment receipt)
Paypal (we will send out a payment request on receipt of this application)
Credit Card

Card Type, Card Number, Start Date, Expiry Date, Security Number, Issue Number (switch only), Name on Card, Card Billing Address, Postcode

Please send completed forms to the address below. On receipt, we will process your enrolment and payment. Full course confirmations shall only be sent once payment has cleared.

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## *Course Enrolment Conditions*

1. These Course Enrolment Conditions apply to all training services provided by Dark Matter Composites Ltd (DMC). Customer's Terms & Conditions or deviations from these are not applicable unless agreed in writing.
2. It is the customers' responsibility to check that the course is suitable for its delegate(s) training needs. We shall advise on course content and anticipated outcome as requested.
3. Enrolments are taken on a first come, first served basis and shall only be confirmed on receipt of completed enrolment forms and receipt of full payment.
4. For company and group bookings, an enrolment form must be completed for each delegate.
5. Courses will be confirmed as running as soon as sufficient applications are received and no later than 2 weeks prior to the course start date.
6. All course fees are per delegate per course and include: provision of all materials, tools and protective clothing (except footwear, see below); lunch, tea & coffee for each day of the course; and course handouts.
7. Payment of course fees are due prior to the course start date. Prices stated are in pounds sterling.
8. Travel, accommodation and general sustenance expenses incurred by delegates are excluded from the course fees (except where otherwise stated).
9. Cancellations by delegates prior to the course will be refunded on the following basis: 14 calendar days or more 80%; less than 14 calendar days no refund. If a cancellation is unavoidable by DMC, an alternative date or full refund will be given.
10. Transferral of bookings applies to a change in course or course date and must be completed 14 calendar days prior to the start of the original course booking. Each transferred booking, will be subject to an administration and materials charge equivalent to 20% of the course fee. A maximum of two booking transfers will be processed. Outside of these transfer terms, cancellation terms will apply.
11. Delegates must advise DMC of any dietary requirements or special needs on enrolment.
12. The outcome and achievement of delegates is based upon the ability and attendance of the individual delegates.
13. DMC shall not be liable for any kind of damage arising directly or indirectly out of or in connection with the performance or non-performance of the training, unless such damages are caused by the gross negligence or intent of DMC or its employees.
14. Delegates attending DMC courses must comply with safety procedures covered at the start of and during each course. DMC seeks to achieve the highest standards in health, safety and the environment and anticipate that customers and their delegates will assist us in achieving these objectives.
15. Delegates must wear full-length trousers and closed leather shoes or safety boots (no trainers) during the course. Delegates who do not wear appropriate clothing and footwear will not be able to take a full part in practical sessions.
16. Marked tools and equipment shall be issued and checked with delegates at the start of the course. Delegates may be charged for tools and equipment not returned.
17. Copyrights on licensed material provided by DMC remain with DMC. Copyrights on third party licensed materials remain with identified third parties. Licensed materials include but are not limited to all course documentation, manuals and instructions in electronic or printed form. The Customer/Delegate shall not copy, make accessible or distribute licensed material to third parties without DMC's prior written consent.
18. The Customer/Delegate acknowledges and agrees that a breach of copyright cannot be compensated adequately by an award of damages or indemnity or other pecuniary remedy and DMC shall be entitled in the event of any such breach to the remedies of injunction specific performance or other equitable relief to redress any such breach.
19. DMC will treat any information about delegates and/or any internal business information of the Customer/Delegate as confidential.
20. The validity, construction and performance of these conditions shall be governed by the Laws of England.

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