



## dark matter composites ltd

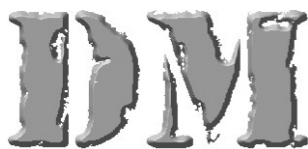
<b>Course Title:</b>	<b>Composites for Engineers &amp; Designers, Stage 1 - Materials &amp; Processes</b>
<b>Course Code:</b>	<b>DMSC61</b>
<b>Course Fees:</b>	£1,700.00 course fee plus £340.00 UK VAT (£2,040.00 per delegate)
<b>Structure:</b>	60% theory, 40% practical, 10 delegates maximum, no experience 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
<b>Monday</b>	<u>Introduction</u> <u>Equipment issue</u> <u>Health &amp; Safety</u> Measures & Legislation <u>Theory &amp; Discussion</u> Composites history Composites theory	<u>Theory &amp; Discussion</u> Matrix materials Reinforcing materials Fabric types Laminate theory and ply orientation Lay-up specifications	<u>Theory &amp; Discussion</u> Sandwich structures Core materials Processing composite materials  <u>Theory &amp; Practical</u> Tooling care and preparation Release agents	<u>Theory &amp; Guided Practical</u> Wet lay up laminating Design a laminate to suit a load requirement Production of a wet lay-up part including calculations, gel coat & laminate application
<b>Tuesday</b>	<u>Theory</u> Resin flow & film infusion laminating External & internal media with vacuum bagged & closed moulding  <u>Demo &amp; Practical</u> Trial panels & evaluation	<u>Theory &amp; Discussion</u> Vacuum bagging Bagging materials & methods Leak detection  <u>Guided Practical</u> Design of distribution media for resin flow infused part	<u>Guided Practical</u> 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> Resin calculations Predicting flow fronts & infusion times Final resin flow infusion and evaluation of parts  <u>Demonstration</u> Resin film infusion laminating
<b>Wednesday</b>	<u>Theory, Demo &amp; Guided Practical</u> Pre-preg laminating Material templating, ply orientation, nesting & kitting Design a laminate to suit a load requirement	<u>Theory</u> Processing & preparation of core materials  <u>Guided Practical</u> Pre-preg laminating of part with sandwich structure	<u>Demo &amp; Practical</u> Envelope vacuum bag & cure pre-preg part  <u>Theory</u> Matrix curing & post-curing, temperature & pressure profiles Tg points	<u>Theory &amp; Videos</u> Resin transfer moulding Hot press moulding Filament winding Pultrusion Automated tape laying & fibre placement
<b>Thursday</b>	<u>Theory &amp; Discussion</u> Causes of and identifying defects Manual & NDT inspection Production & quality controls In-service monitoring	<u>Theory, Demos &amp; Practical</u> Breakout parts produced Trimming & finishing composites	<u>Theory &amp; discussion</u> Adhesion & bonding methods  <u>Theory &amp; Demos</u> Failure modes Re-work & repair principles Repair techniques	<u>Guided Practical</u> GRP and pre-preg repairs including removal of damage, preparation of the repair surface & laminating of repairs  <u>Reinstate Workshop</u>
<b>Friday</b>	<u>Theory &amp; Discussion</u> Tooling and component design principles, types materials & life Re-cycling & environmental issues	<u>Practical &amp; Discussion</u> Case studies for tooling and component designs & problem solving	<u>Theory &amp; Discussion</u> Laminate calculations Finite element analysis Testing composites On-line resources	<u>Written test (1hour)</u>  <u>Equipment return</u>  <u>Summary / Feedback</u>



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**Course Title:** Composites for Engineers & Designers, Stage 2 - Advanced Design

**Course Code:** DMSC62

**Course Fees:** £1,700.00 course fee plus £340.00 UK VAT (£2,040.00 per delegate)

**Structure:** 25% theory, 75% practical, 10 delegates maximum

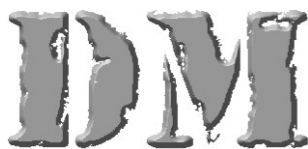
**Pre-requisite:** Prior completion of DMSC61

### Summary

This course picks up from where our stage 1 engineers and designers course ended. We address the intricate detailing of both laminate and tooling design through a structured problem solving approach discussing real problems and possible solutions. The course is a bridge between production and design to aid communication between departments. It was originally designed to support training for CAE tools such as Fibresim, as many companies and personnel had access to the tools but did not use them effectively.

### Course Content

	09:00 – 11:00	11:15 – 13:15	13:45 – 15:45	16:00 – 18:00
Monday	<u>Introduction</u>  <u>Equipment issue</u>  <u>Theory &amp; Demos</u> Refresh of composite theory, pre-preg materials & processes	<u>Theory &amp; Discussion</u> Orientation standards, part & mould side definitions & handing issues  Balanced & unbalanced laminates  Distortion & springback	<u>Practical &amp; Discussion</u> Design a range of laminates using various materials to address balanced, unbalanced, semi-isotropic, distorted, undistorted, springback & handed issues	<u>Guided Practical</u> Laminate materials to the designs completed  Identify further problems due to material application  Vacuum bag & cure parts
Tuesday	<u>Theory &amp; Discussion</u> Ply datums & placement Draping, distortion, deviation & sequences Joins, splices, darts, discontinuities & sequences  Production of lay-up manuals	<u>Practical</u> Design of laminates over a range of shapes/features to address datums, placement, draping, distortion, deviation, joins, darts, discontinuities, & laminate sequence issues	<u>Discussion</u> Review of laminate designs and potential issues  <u>Practical</u> Prepare material plies to the laminate designs completed	<u>Guided Practical</u> Laminate materials to the designs completed Identify, record & solve problems encountered due to material application  Vacuum bag & cure parts
Wednesday	<u>Theory &amp; Discussion</u> Metal verses composite tooling & thermal expansion issues Tooling & component features & design principles  Tiled and templated laminating methods for composite tooling	<u>Demo &amp; Practical</u> Preparation of patterns including fitting split/joint boards, shaped locators & releasing  Lamination of a mould tool using tiled, orientated and balanced plies and vacuum de-bulks	<u>Practical</u> Design of a range of composite mould tooling over a range of shapes/features to address both laminate and production process requirements	<u>Discussion</u> Review of mould tooling designs in relation to laminate and production requirements and potential issues
Thursday	<u>Theory &amp; Discussion</u> Structural laminate & ply loading requirements  Consideration shape, joins, inserts and fixings	<u>Practical</u> Complete simple indicative calculations to establish initial processes, materials, insert design and structural laminate requirements	<u>Discussion</u> Review of calculations completed and initial laminate designs and potential issues	<u>Practical</u> Design of mould split lines, laminate & ply sequence to meet structural requirements  Compilation of lay-up manual to produce the structural parts
Friday	<u>Discussion</u> Review of designs to meet structural requirements and potential issues	<u>Guided Practical</u> Full material preparation & application for structural parts, vacuum bag & cure as required  Modification of lay-up manual as required	<u>Practical &amp; Discussion</u> Breakout all parts made  Full review of all parts made, identifying unexpected issues and solutions	<u>Written Test</u>  <u>Reinstate Workshop</u>  <u>Equipment return</u>  <u>Summary / Feedback</u>



**dark matter composites ltd**

## **Composite Course Schedule 2024**

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 (incl. 20% UK VAT)</b>	<b>Course Dates</b>
DMSC50	Introduction to Composite Materials & Processes	£2,040.00	<i>please call/email us for further details</i>
DMSC51	Wet Lay-Up Laminating	£2,040.00	15-19 April 2024
DMSC52	Spray Lay-Up Laminating	£2,040.00	<i>please call/email us for further details</i>
DMSC53	Resin Infusion Laminating & Light RTM	£2,040.00	22-26 April 2024
DMSC54	Pre-Preg Laminating – Stage 1	£2,040.00	11-15 Mar 2024 11-15 Nov 2024
DMSC55	Pre-Preg Laminating – Stage 2	£2,040.00	18-22 Nov 2024
DMSC56	Pre-Preg Mould Making	£2,400.00	13-17 May 2024
DMSC57	Trimming, Finishing & Assembly of Composites	£2,400.00	10-14 Jun 2024
DMSC58	Composite Repair – Stage 1	£2,400.00	18-22 Mar 2024 14-18 Oct 2024
DMSC59	Composite Repair – Stage 2	£2,400.00	21-25 Oct 2024
DMSC60	Producing Your Own Composite Parts	£2,040.00	3-7 Jun 2024
DMSC61	Composites for Engineers & Designers Stage 1 - Materials & Processes	£2,040.00	29 Jan – 2 Feb 2024 9-13 Sep 2024
DMSC62	Composites for Engineers & Designers Stage 2 - Advanced Design	£2,040.00	16-20 Sep 2024

### **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.



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## *Composite Course Information*

### **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.

### **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 may be able to reclaim UK 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 2024.
- 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 fabric, perforated or open footwear) 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.

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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**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? If 'Yes' please give details:			Yes / No

**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	MasterCard / Visa / Maestro (Switch) / Visa Electron / Solo / American Express											
Card Number												
Start Date						Expiry Date						
Security Number						Issue Number (switch only)						
Name on Card												
Card Billing Address												
	Postcode											

Please email completed forms to [info@darkmattercomposites.co.uk](mailto:info@darkmattercomposites.co.uk). 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. Bespoke courses will be confirmed on receipt of full course payment.
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 or fabric footwear) 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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