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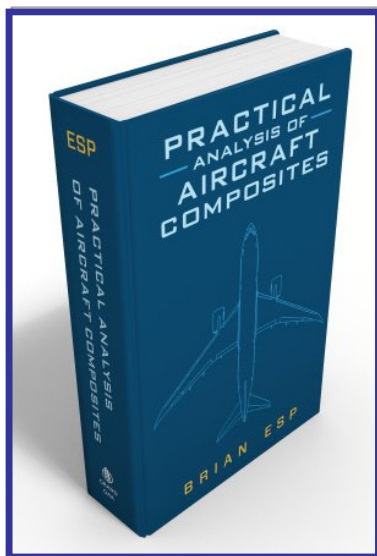
General information at
www.espcomposites.com

Course homepage
courses.espcomposites.com

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Preliminary Information for Online Course Based on:



Practical Analysis of Aircraft Composites

Instructor:
Brian Esp, Ph.D, P.E.

Preliminary Information

- P.1 — Instructor's Background
- P.2 — Applicability
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P.1 — Instructor's Background

- Academic and industry experience with both composites and metals (20+ years)
 - ability to *blend the academic theory with industry experience*
 - author of the book ***Practical Analysis of Aircraft Composites***
 - worked with many esteemed peers
- Broad structural analysis experience
 - aircraft and space applications
 - civil transport and military aircraft
 - large programs, small programs, R&D
 - original production and repairs
 - *design and hands-on experience with composites*

P.2 — Applicability

■ Primarily intended for structural analysts

- May also be appropriate for designers, M&P, or other areas of discipline

- Not sure? See the **free book excerpt** at www.espcomposites.com
 - also free courses content (discussed later)

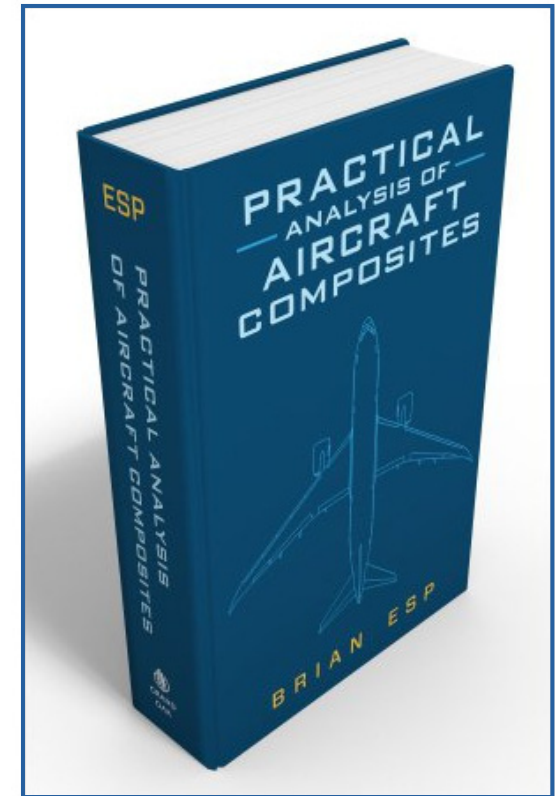
■ Industries

- focus on aircraft, especially large aircraft
 - significant history of successful use of composites
 - many well-established analysis methods
 - aircraft methods may carry over to other industries
- the course and the book have a range of applicability
 - aircraft
 - space
 - automotive
 - marine

any structure made of thin laminates
(plates, beams, columns, stiffeners, skins, etc.)

P.3 — Recommended Resources

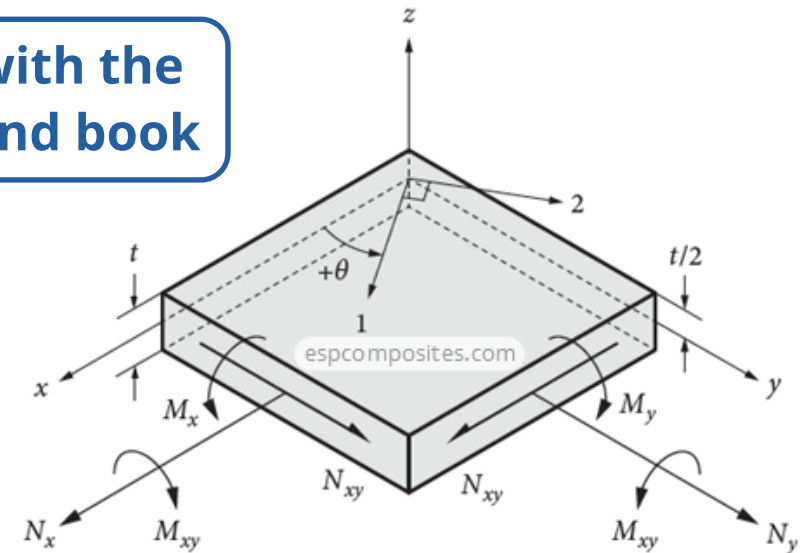
- The book ***Practical Analysis of Aircraft Composites*** is highly recommended
 - significant development effort
 - assisted by industry experts
 - information at www.espcomposites.com
- This course is **entirely based on** the comprehensive book
- **Combine** the course and book
 - *Quickly* get up to speed via the course
 - Use the book as *in-depth* reference
 - Course chapters align with the book chapters



P.3 — Recommended Resources (cont.)

- Software (recommended)
 - download at www.espcomposites.com
 - NOTE: some modules are free for company use (some are not)
 - for training purposes (not for profit), all modules are always **free**
- eLaminate© is a popular Excel based module that uses Classical Laminate Theory (CLT)
 - A, B, D matrices
 - laminate and ply strain/stress
 - effective properties
 - simple I/O (single sheet)
 - immediate calculations
 - **free for ALL use cases**
 - download at www.espcomposites.com
- Other modules used in the course are available for immediate download

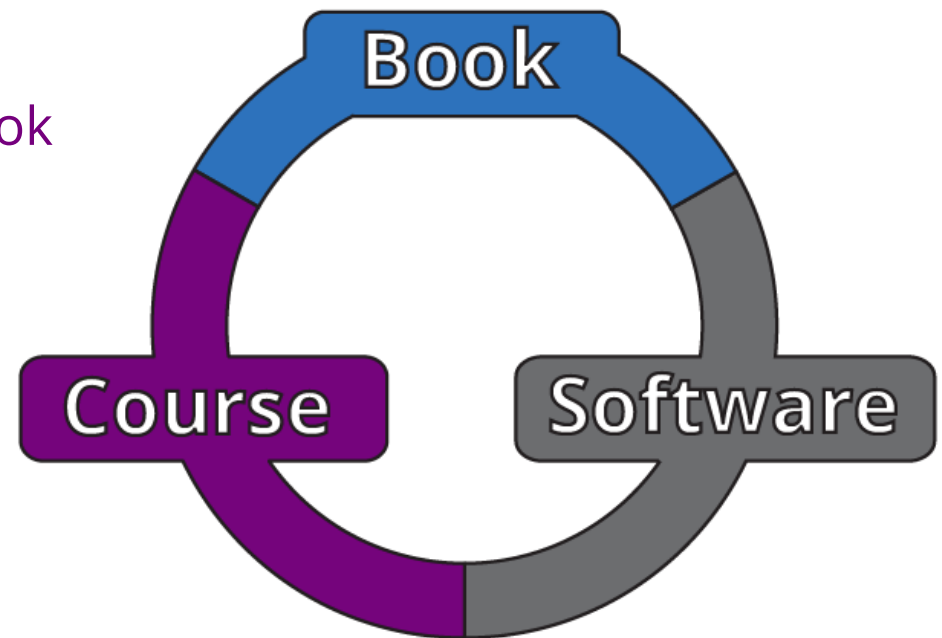
in sync with the
course and book



P.3 — Recommended Resources (cont.)

FULLY INTEGRATED SOLUTION

- **Course**
 - convenient
 - quickly get up to speed
 - chapters consistent with the book
- **Book**
 - in-depth reference
 - many additional topics
- **Software**
 - applications
 - learning aid
 - consistent with the course and book



P.4 — General Objectives and Approach

- General Objectives for the Course and the Book
 - present **useful approaches from academia**
 - discuss some of the **pitfalls of purely academic approaches**
 - present **practical engineering approaches** when “pure” solutions are not adequate
- Minimal amount of theory
 - simplest equations to get to the job done
 - increased analysis complexity does not necessarily improve accuracy or usefulness
 - present approaches with a history of success
- Present **fundamental strategies and methods**
 - analyst combines solutions/methods for the specific application
 - no “cook book” solutions for higher level structures such as a wing or fuselage frame
 - **significant challenges of providing “cook book” solutions:**
https://www.espcomposites.com/book/higher_level.html

P.5 — Course Overview

■ Basic Analysis Course

- **introduction** to composites and comparisons to metals
 - understand what a “validated analysis method” is (**key concept**)
 - not taught in academia, but especially useful for composites
 - **elastic** properties for both materials and laminates (A , B , D matrices are one of the major outputs). Presentation is streamlined.
 - strength prediction for laminates
 - **unnotched** (pristine) and **small notch** (with a hole) strength prediction
 - **academic approaches may differ from practical engineering approaches**
 - *small holes are a very important practical consideration (extra attention)*
-

250+ slides and 5.5 hours of video

Note: The book covers many more topics. Some of the course topics are also covered in greater detail in the book.

P.5 — Course Overview (cont.)

Book has 28 Chapters and 7 Appendices

	Book Contents (Partial)	Free (Low Res)	Basic Analysis Course (High Res)
general introduction and awareness	Chapter → 1 Introduction		
validated analysis method and comparisons	→ 2 Analysis Overview and Composites Versus Metals		
elasticity	→ 3 Material Elasticity		
	→ 4 Laminate Elasticity		
	→ 5 Effective Elastic Constants		
	→ 6 Bending Stiffness of Plates		
stresses/strains	→ 7 Laminate and Ply Stress/Strain		
	→ 8 Interlaminar Stress		
strength prediction (both academic and practical approaches)	→ 9 Unnotched Strength		
	→ 10 Small Notch Strength		
	Appendices A Micromechanics		
special topics (ST2 is optional)	Special Topics ST1 Developing a Validated Analysis Method		
	ST2 Ply-Based Failure Criteria Shortcomings		

- Special topic videos do not have a correlated chapter to the book
- Created to assist with concepts from the course

Note: For further information about the topics, see the **free excerpt** (TOC) at:
www.espcomposites.com

P.5 — Course Overview (cont.)

EXAMPLE PROBLEMS

- Example problems are **only in the book**
 - *referenced during the course*
- CLT (Classical Laminate Theory) problems
 - tedious to perform but directly calculated (examples not deemed necessary)
 - CLT examples in many academic based books
 - software is commonly used (manual calculations not common)
- Course Strategy:
 - concentrate on the more challenging aspects of composite analysis
 - referencing the book examples keeps the course flowing and focused

P.6 — Free Content

▪ Free videos/PDFs

- available at courses.espcomposites.com
- *low resolution compared to the purchased course*
- preview the course and ensure system compatibility
- Special Topics (ST1 and ST2) contain *some additional content not included in the book*
- free content assists the composite community
- free videos/PDF for Chapters and 1 and 2 correlate to the free sample excerpt of the book
 - download free excerpt at www.espcomposites.com

P.7 — Purchased Course Rights

- With the **purchase** of the course:

1. View/listen to all *high resolution* videos (access for **15 days**)

2. Download/print all *high resolution* PDF files

- three sets of PDF files suitable for:

- standard viewing/printing

- vertical binders

- horizontal binders

} ***bonus sets***

■ Prohibited

1. Prohibited to save, download, copy, or distribute video/audio

- videos are for viewing only

2. Prohibited to distribute PDF files or printed copies

- for personal use only

3. Prohibited to share login access (unless authorized)

P.8 — Access

- Free content:
 - **Videos/PDFs** at **courses.espcomposites.com**
 - Requires account creation
- Basic Analysis Course
 - **Purchase** at **courses.espcomposites.com**
 - Choose Company or Individual (distinction discussed next)

Course links also at **www.espcomposites.com**

Can also directly download the free content PDFs
without creating an account

P.9 — Pricing (Company vs. Individual)

■ Company Pricing

- Case 1: purchased by companies for their employee(s)
- Case 2: company directs an employee to purchase
- **May be eligible to evaluate the full 250 page PDF for the course.**

Request demo PDF at:

- contact@espcomposites.com or
- “Contact” section at www.espcomposites.com

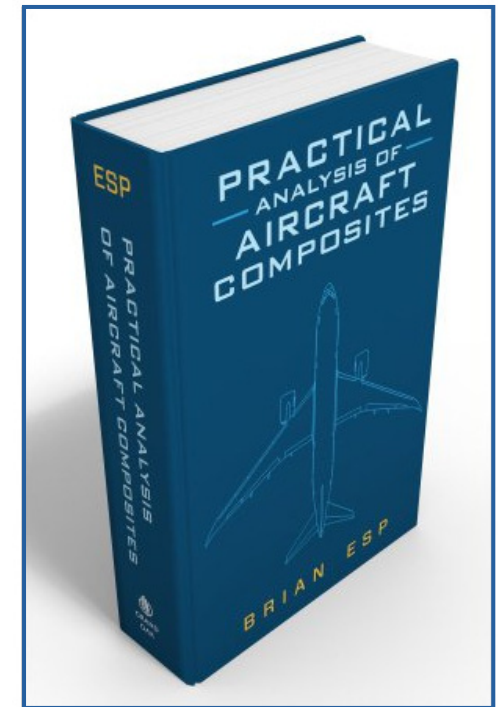
■ Individuals

- not directed by a company to purchase
- personal improvement
- ***discounted pricing***

choose the appropriate course at
courses.espcomposites.com

P.10 — Slide Information

- Course (video/PDF) **chapter numbers** *correspond* to the book chapter numbers
- Course (video/PDF) **subsection numbers (X.X)** *usually do not correspond* to the book subsections



chapter or major section



general information



slide number



End of Preliminary Information

Up Next

Chapter 1: Introduction