# Time Table

<table>
<thead>
<tr>
<th>TIME</th>
<th>Monday 30th September</th>
<th>Tuesday 1st October</th>
<th>Wednesday 2nd October</th>
<th>Thursday 3rd October</th>
<th>Friday 4th October</th>
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<tbody>
<tr>
<td>9.00 - 9.45</td>
<td>Altenbach</td>
<td>Barlat</td>
<td>Tarleja</td>
<td>McCartney</td>
<td>Talreja</td>
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<tr>
<td>9.45 - 10.30</td>
<td>Altenbach</td>
<td>Barlat</td>
<td>Tarleja</td>
<td>McCartney</td>
<td>Talreja</td>
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<tr>
<td>11.00 - 11.45</td>
<td>Marsavina</td>
<td>Altenbach</td>
<td>Barlat</td>
<td>McCartney</td>
<td>Talreja</td>
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<tr>
<td>11.45 - 12.30</td>
<td>Marsavina</td>
<td>Altenbach</td>
<td>Barlat</td>
<td>McCartney</td>
<td>Talreja</td>
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<tr>
<td>14.00 - 14.45</td>
<td>Sadowski</td>
<td>Marsavina</td>
<td>Altenbach</td>
<td>Talreja</td>
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<tr>
<td>14.45 - 15.30</td>
<td>Sadowski</td>
<td>Marsavina</td>
<td>Altenbach</td>
<td>Talreja</td>
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<td>16.00 - 16.45</td>
<td>McCartney</td>
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<td>16.45 - 17.30</td>
<td>McCartney</td>
<td>Sadowski</td>
<td>Barlat</td>
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# ADMISSION AND ACCOMMODATION

Applicants must apply at least one month before the beginning of the course. Application forms should be sent on-line through our web site: [http://www.cism.it](http://www.cism.it) or by post.

A message of confirmation will be sent to accepted participants. If you need assistance for registration please contact our secretariat.

The 700,00 Euro registration fee includes a complimentary bag, four fixed menu buffet lunches (Friday not included), hot beverages, on-line/downloadable lecture notes and wi-fi internet access.

A limited number of participants from universities and research centres who are not supported by their own institutions can be offered board and/or lodging in a reasonably priced hotel. Requests should be sent to CISM Secretariat by **July 20, 2013** along with the applicant’s curriculum and a letter of recommendation by the head of the department or a supervisor confirming that the institute cannot provide funding. Preference will be given to applicants from countries that sponsor CISM.

Information about travel and accommodation is available on our web site, or can be mailed upon request.

Please note that the centre will be closed for summer vacation the first three weeks in August.

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**For further information please contact:**

CISM  
Palazzo del Torso  
Piazza Garibaldi 18  
33100 Udine (Italy)  
tel. +39 0432 248511 (6 lines)  
fax +39 0432 248550  
e-mail: cism@cism.it
Failure as a limit state of the material behavior is well known from engineering practice. Different types of failure can be identified:
- transition from the elastic to plastic state
- loss of stiffness
- loss of fracture resistance at different scale levels
- ultimate strength
- fatigue.
In addition, failure can be accompanied by various types of damage. The course will discuss basic concepts and new developments in failure and damage analysis with focus on advanced materials such as composites, laminates, sandwiches and foams, and also new metallic materials. Starting from some mathematical foundations (limit surfaces, symmetry considerations, invariants) new experimental results and their analysis will be presented. Finally, new concepts for failure prediction and analysis will be introduced and discussed.

The classical strength criteria developed intensively in the 19th and 20th century are mostly based on the comparison of the stress state (usually three-dimensional) with some scalar-valued properties estimated in tests. Such a phenomenological approach can be easily extended to other types of limit states of a material (for example, plastic behavior, and damage or fracture toughness). But even in the case of classical, but anisotropic structural materials, predictions are not always satisfactory and the effort required for their experimental confirmation can increase dramatically. Furthermore, in the case of advanced materials additional effects such as load dependent material response should be taken into account. These effects can induce mechanisms leading to different behavior in tension and compression.

Considering advanced metallic and non-metallic materials new methods of failure and damage prediction will be discussed. Based on experimental results the traditional methods will be revised. In some cases it is enough to extend the classical approaches (for example, for metallic sheet material). In other situations (foams, composites) this is not satisfying since the different mechanisms cannot be adequately presented.

The course is addressed to doctoral students, young researcher, senior researchers, practicing engineers.

PRELIMINARY SUGGESTED READINGS


INVITED LECTURERS

Holm Altenbach - Otto-von-Guericke-Universität Magdeburg, Germany
6 lectures on: Examples of failure behavior, Theory of invariants and symmetry, Classical isotropic models, Compressibility and incompressibility, Non-classical models, Anisotropic models.

Frederic Barlat - GIFT-POSTECH, Pohang, South Korea

Liviu Marsavina - Politehnica University of Timisoara, Romania

Neil McCartney - National Physical Laboratory, Teddington, UK
6 lectures on: Failure and Damage of Composite Laminates. Predicting properties of undamaged lamina, Predicting properties of undamaged laminae, Principles controlling fracture processes in composites, Prediction of ply cracking in general symmetric laminates, Prediction of ply cracking in laminates subject to loading that includes bend deformation, Some other important issues.

Tomasz Sadowski - Lublin University of Technology, Poland

Ramesh Talreja - Texas A&M University, College Station, TX, USA
6 lectures on: Continuum Damage Mechanics for Composite Materials. Clarification of strength, fracture and damage in heterogeneous solids, Role of constraint in lamina failure, Homogenization and representative volume element concepts, Continuum Damage and internal variables, Damage modes, Thermodynamics framework for composite response with damage, Damage evolution, Synergistic damage mechanics.

LECTURES

All lectures will be given in English. Lecture notes can be downloaded from CISM web site, instructions will be sent to accepted participants.
FAILURE AND DAMAGE ANALYSIS
OF ADVANCED MATERIALS
Udine, September 30 - October 4, 2013
Application Form
(Please print or type)

Surname ___________________________________________________________________________________
Name ______________________________________________________________________________________
Affiliation __________________________________________________________________________________
Address _____________________________________________________________________________________
________________________________________________________________________________________________
E-mail _______________________________________________________________________________________
Phone _____________________________________ Fax _________________________________________________

Method of payment upon receipt of confirmation (Please check the box)
The fee of Euro 700,00 includes VATA/VA tax and excludes bank charges
❏ I shall send a check of Euro ___________________________
❏ Payment will be made to CISM - Bank Account N° 094570210900,
VENETO BANCA - Udine (CAB 12300 - ABI 05035 - SWIFT/BIC
VEBHIT2M - IBAN CODE IT46 N 05035 12300 09457 0210900).
Copy of the receipt should be sent to the secretariat
❏ I shall pay at the registration counter with check, cash or VISA
Credit Card (Mastercard/Eurocard, Visa, CartaSì)

IMPORTANT: CISM is obliged to present an invoice for the above sum. Please indicate to whom the invoice should be addressed.

Name _______________________________________________________________________________________
Address _____________________________________________________________________________________
________________________________________________________________________________________________
________________________________________________________________________________________________
C.F.* _____________________________________________________________________________________
VAT/IVA* No ___________________________________________________________________________________
(*) Only for EU residents or foreigners with a permanent business activity in Italy

Only for Italian Public Companies
❏ I ask for IVA exemption (ex law n. 537/1993 - art. 14 comma 10).

Privacy policy: I understand that data received via this form will be used only to provide information about CISM and its activities, within the limits set by the Italian legislative decree no. 196/2003 and subsequent amendments.
Complete information on CISM's privacy policy is available at www.cism.it.

I have read the "Admission and Accommodation" terms and conditions and agree.

Date _______________ Signature ______________________________