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Unit 1




IEEE/EIA 12207 Software Life Cycle Processes

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Seminar themes (1 of 3)

- ◆ Nature of 12207
 - ◆ A *framework of related names and concepts* ... not necessarily all of the best practices for software
 - ◆ *Processes* ... not procedures
 - ◆ *Life cycle processes* ... not a life cycle model

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Seminar themes (2 of 3)

- ◆ The best use of IEEE/EIA 12207 is *enterprise level adoption*.
 - ◆ It is intended for *voluntary adoption* rather than contractual imposition.
 - ◆ It emphasizes *specific one-party claims of compliance* rather than two-party tailoring.
 - ◆ It has *relationships to contextual standards* affecting enterprise goals.
 - ◆ It has *relationships to process and data standards* that may be used to implement its processes.

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Seminar themes (3 of 3)

- ◆ IEEE/EIA 12207 is a *strategic, integrating standard* for the IEEE software engineering collection.
 - ◆ It provides a unifying approach to *life cycle process standardization*.
 - ◆ It provides a unifying approach to *life cycle data standardization*.
 - ◆ IEEE is now *improving the fit*.
 - ◆ IEEE plans to build upon the standard with *future strategic efforts*.

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Part 1 - Software engineering

- ◆ *Software Engineering*
 - ◆ Definition
 - ◆ Model
 - ◆ Relationship to other Disciplines
- ◆ Software Engineering Standards
- ◆ Software Engineering Standards Developers

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Software engineering: Definition

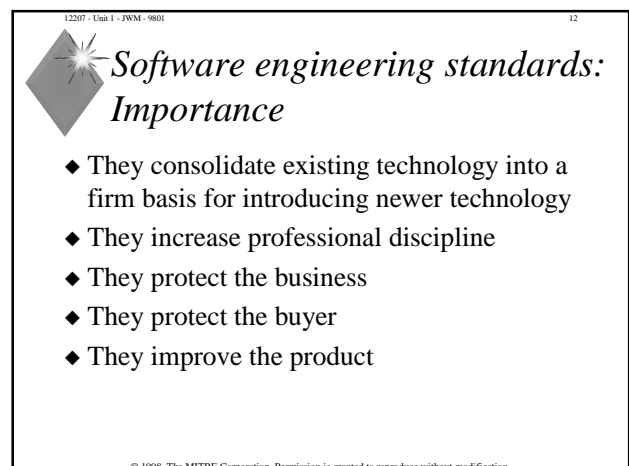
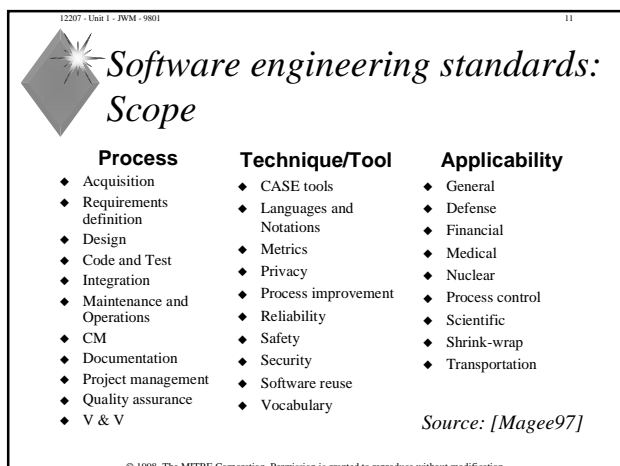
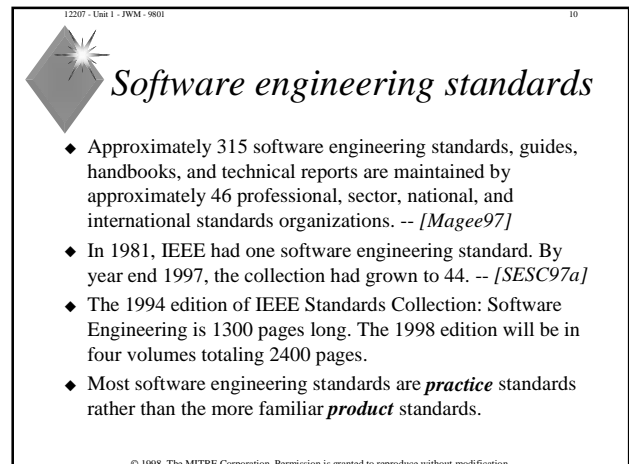
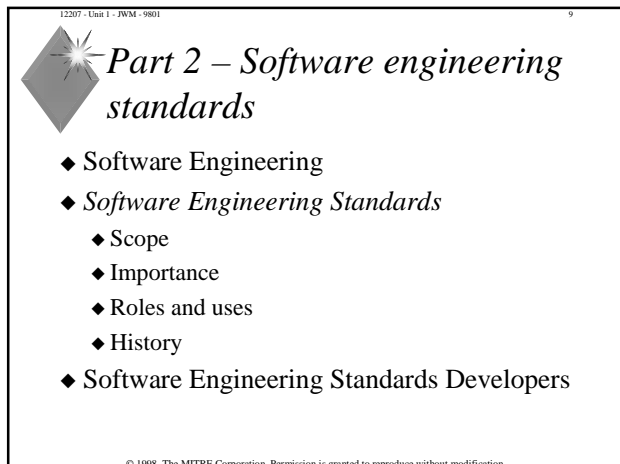
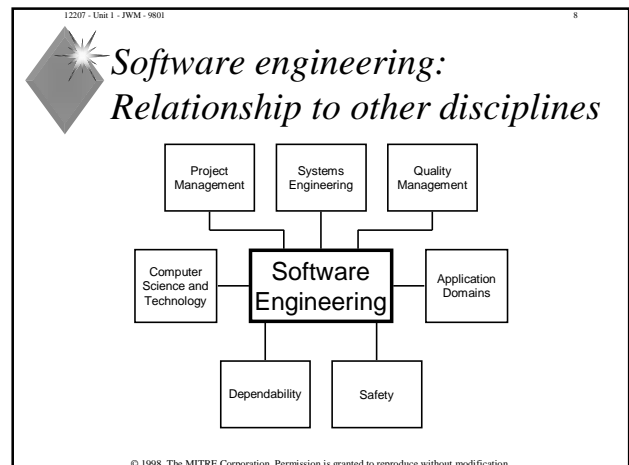
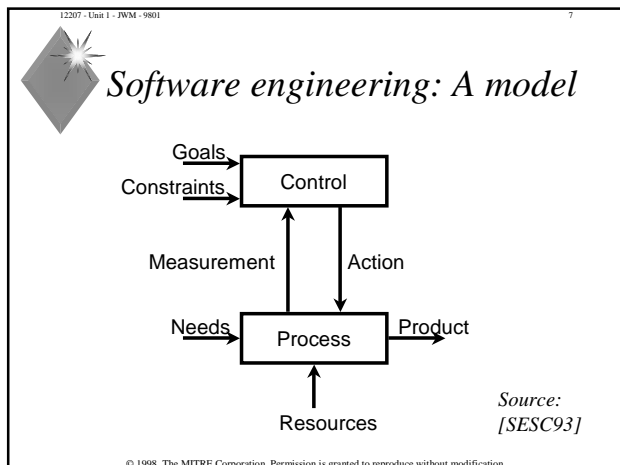
(1) *The application of a systematic, disciplined, quantifiable approach to the development, operation and maintenance of software, that is, the application of engineering to software.*

(2) *The study of approaches as in (1).*

-- IEEE Std 610.12

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Software engineering standards: Roles

- ◆ Specify techniques to develop software **faster, cheaper, better**, IEEE 982.1 (Measures for Reliable SW)
- ◆ Provide consensus validity for "best practices" that cannot be scientifically validated, IEEE 1008 (Unit Testing)
- ◆ Provide a systematic treatment of "ilities", IEEE 730 (SW Quality Assurance)
- ◆ Provide **uniformity** in cases where agreement is more important than small improvements, IEEE P1320.1 (IDEF0)
- ◆ Provide a **framework for communication** between buyer and seller, IEEE/EIA 12207 (SW Life Cycle Processes)
- ◆ Give precise names to concepts that are fuzzy, complex, detailed and multidimensional, IEEE 1028 (SW Reviews)

More exciting
More effective

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Software engineering standards: Uses

- ◆ Terminology
- ◆ Best practice adoption
- ◆ Organizational badge
- ◆ Contractual agreement

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Software engineering standards: Organizational goals

- ◆ Improve and evaluate software competence
- ◆ Framework for two-party agreements
- ◆ Evaluation of software products
- ◆ Assurance of high integrity levels for software products

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Software engineering standards: History

- ◆ 1968: Term *software engineering* coined at NATO conference
- ◆ 1973: US National Bureau of Standards writes *Guidelines for Documentation of Computer Programs and Automated Systems*
- ◆ 1974: US Navy initiates Mil-Std-1679, *Weapons System Development*, including guidelines for embedded computing resources.
- ◆ 1976: IEEE creates predecessor of SESC
- ◆ 1979: IEEE Std 730, *Software Quality Assurance Plans*
- ◆ 1987: ISO and IEC form JTC1 on Information Technology [Industry]
- ◆ 1998(?): JTC1/SC7 gains "horizontal" status

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Part 3 – Software engineering standards developers

- ◆ Software Engineering
- ◆ Software Engineering Standards
- ◆ *Software Engineering Standards Developers*
 - ◆ International: SC7 and others
 - ◆ US: IEEE and others

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SWE standards developers: International

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graph TD
    ISO[ISO] --- JTC1[JTC1]
    IEC[IEC] --- JTC1
    ITU[ITU] --- JTC1
    JTC1 --- TC176[TC176  
Quality]
    JTC1 --- TC56[TC56  
Dependability]
    JTC1 --- SC65A[SC65A  
Functional Safety]
    JTC1 --- SC1[SC1  
Terminology]
    JTC1 --- SC7[SC7  
Software Engineering]
    JTC1 --- SC22[SC22  
Language, OS]
    SC7 --- WG7[WG7  
Life cycle processes]
    SC7 --- OtherWGs[Other WGs]
    SC7 --- WG9[WG9  
Ada]
    SC7 --- WG15[WG15  
POSIX]
  
```

The focal point in international standards is **ISO/IEC JTC1/SC7**. Other committees, though, deal with related work. Members of these committees are "national bodies," i.e. countries, represented by "national delegations."

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SWE standards developers: ISO/IEC JTC1/SC7 program


- ◆ WG2: System software documentation
- ◆ WG4: Tools and environment
- ◆ WG6: Evaluation and metrics
- ◆ **WG7: Life cycle management**
- ◆ WG8: Integral life cycle processes

- ◆ WG9: Classification and mapping
- ◆ WG10: Process assessment
- ◆ WG11: Software engineering data definition and representation
- ◆ WG12: Functional size measurement
- ◆ WG13: Software measurement process

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SWE standards developers: Current standards of SC7

- ◆ Six “legacy” standards
- ◆ ISO/IEC 9126:1991, Product quality characteristics
- ◆ ISO 9127:1988, User documentation and cover information for consumer software packages
- ◆ ISO/IEC TR 9294:1990, Management of software documentation
- ◆ ISO/IEC 11411:1995, Representation of state transition diagrams
- ◆ ISO/IEC 12119:1994, Software packages: Quality requirements and testing
- ◆ **ISO/IEC 12207:1995, Software life cycle processes**
- ◆ ISO/IEC 14102:1995, Evaluation and selection of CASE tools
- ◆ ISO/IEC 14143-1:1997, Functional size measurement
- ◆ ISO/IEC 14568:1997, Diagram exchange language for tree charts

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SWE standards developers: US

ANSI

NCITS

AIAA

ANS

ASTM

EIA

.....

IEEE

PMI

INCOSE

.....

SESC

About 550 organizations in the U. S. make standards.


About half of them are accredited by **ANSI**, allowing them to participate in international standardization activity.

The focal point (in the U. S.) is the **Software Engineering Standards Committee (SESC)** of the IEEE Computer Society

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SWE standards developers: IEEE

IEEE Board of Directors

Other Societies

Similar organizations

Computer Society

Standards Activity Board

IEEE Standards Board

Other "Sponsors"

Stds Coordinating Committees

SW Engineering Standards Committee

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