Methods in Computer Science Education: design

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Subject Certification A041

- **You are able to teach all the subjects included in A041: Computer Science**

Where

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When

What

- These are the question you are asking for:

- **Where** I can tech Computer Science

- **When** I can teach Computer Science

- **What** I can teach in Computer Science

Where

- **Nowadays you can teach computer Science in different kinds of high schools.**

- **Different kinds means that you must have a completely different approach for any kind of school**

- **ITE - Istituto Tecnico Economico**
- **LSSA - Liceo Scientifico delle Scienze Applicate**
- **ITT - Istituto Tecnico Tecnologico**
- **IPSIA - Istituto Professionale per i Servizi per l'Industria e per l'Artigianato**

- **ITE - Istituto Tecnico Economico:**

Field of studies: amministrazione, finanza e marketing:

specialization:

finanza e marketing:

Computer science:

2 hours a week from first to fourth year

- **ITE – Istituto Tecnico Economico:**

Field of studies: amministrazione, finanza e marketing:

specialization:

relazioni internazionali:

Computer science:

2 hours a week first & second year

Communication Technologies:

2 hours a week third & fourth year

- **ITE - Istituto Tecnico Economico:**

Field of studies: amministrazione, finanza e marketing:

specialization:

Sistemi informativi aziendali:

Computer science:

2 hours a week first & second year

4 hours a week third & fourth year

5 hours a week fifth year

- **ITE - Istituto Tecnico Economico:**

Field of studies: Turismo

Computer science:

2 hours a week first & second year

What

- **ITE - Istituto Tecnico Economico:**

First and second year,
common to all field:

Computer science:

Computer science:

Basic skills on application programs useful for ITE such as

Word processors,

email,

spreadsheet,

browser

maybe specific certifications such as ECDL:

- **ITE – Istituto Tecnico Economico:**

Field of studies:

amministrazione, finanza e marketing:

specialization:

Sistemi informativi aziendali:

Computer science third & fourth year

- **Programming languages**
- **Software developing methodology**
- **Software project development phases**
- **Computer science system and information system**
- **Operating system**
- **Data Base Management System (DBMS)**
- **Data Base project: Linguaggio SQL**
- **Business Multimedia Utility Software**
- **Web instruments and web sites**
- **Computer networks & communication network**
- **Network Data**
- **Business network services**
- **E-commerce & Social networking**

- **ITE – Istituto Tecnico Economico:**

Field of studies:

amministrazione, finanza e marketing:

specialization:

Sistemi informativi aziendali:

Computer science fifth year

- **Different complexity case study on different company activities**
- **Developing techniques to project managment processes**
- **Public administration and company networks**
- **Information security**
- **Privacy and intellectual property protection, cyber crime**

- **ITE - Istituto Tecnico Economico:**

Field of studies:

amministrazione, finanza e marketing:

specialization:

finanza e marketing:

Computer science third & fourth year

- **Information system & computer science system ***
- **Data Base Management System function (DBMS)**
- **Data Base structure**
- **Ipermedia developing phases**
- **Web languages**
- **Web site structure & affordability**
- **Company Network services useful for business**
- **Utility Software & managment software : maintenance & adaptability**
- **Technical field vocabolary & terminology also in English**

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- **Information system is a set of automatic tool like procedures, human resources, rules useful to manage the necessary informations to operate, programming, control and valutate a project.**
- **A computer science system is a subsystem of a information system used to handle all the informations resulting from digital data managment**

- **ITE – Istituto Tecnico Economico:**

Field of studies:

amministrazione, finanza e marketing:

specialization:

relazioni internazionali:

Communication Technologies

third & fourth year

- **Information system & computer science system**
- **Communication Ethos and legal**
- **Economic and society comunication aspects & managment**
- **Technics & and forms of communication**
- **Communication Technologies evolution**
- **Network services userful for company communication**
- **Utility software to represent data (graphically or in with a summary template) for marketing etc.**
- **Data Base Management System functions (DBMS)**
- **Editor to manage oggetti multimedia objects and web pages**

When & What

- **LSSA- Liceo Scientifico Scienze Applicate:**

Computer science:

2 hours a week from first to fifth year

(laboratory only if the school has the availability and without ITP)

- **LSSA- Liceo Scientifico Scienze Applicate:**

First & second year

Computer science:

Basic skills about:

Hardware, Software, Operating Systems, Programming languages, Numbering Systems, Networks. (Scratch)

- **LSSA- Liceo Scientifico Scienze Applicate:**

Third & Fourth year

Computer science:

Developing of problems approach

Algorithms & data structures with coding examples

- **LSSA- Liceo Scientifico Scienze Applicate:**

Fifth year

Computer science:

Database

Research & applications with mutimedia and interaction with other subjects

ITT - Istituto Tecnico Tecnologico

Every field of studies

First year

Tecnologie informatiche:

3 hours a week

ITT - Istituto Tecnico Tecnologico

Every field of studies

First year

Tecnologie informatiche:

Application software like word processors, email, spreadsheet, ECDL certification

ITT - Istituto Tecnico Tecnologico

Field of studies: Computer Science an Telecommunication

Second year

Applied science and technology:

3 hours a week

(laboratory only if the school has the availability and without ITP)

ITT - Istituto Tecnico Tecnologico

Every field of studies

Second year

Applied science and technology:

Basic competences about programming (algorithms and easy developing environments (like Scratch and AppInventor)

ITT - Istituto Tecnico Tecnologico

Field of studies: Computer Science an Telecommunication:

specialization:

Computer Science :

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Computer science:

6 hours a week from third to fifth year

Computer Systems & Networking:

4 hours a week from third to fifth year

Technologies & Design (TPSIT):

3 hours a week third and forth year

4 hours a week in fifth year

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Project Managment & Entrepreneurship, :

3 hours a week in   fifth year

What

ITT - Istituto Tecnico Tecnologico

Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Computer science: third & fourth year:

- Iterative & recursive programming (GUI, OO, WEB, data structures and complexity, different programming languages)

ITT - Istituto Tecnico Tecnologico

Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Computer science: fifth year:

- DBMS, Web programming server side,

- Dynamical web pages

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Computer Systems & Networking third & fourth year:

- Computer architecture
- Microcontrollers (Arduino,Plc,Pic Raspberry)
- Networking (ISO/OSI TCP/IP)
- Cisco Courses

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Computer Systems & Networking fifth year:

- Network security. Encryption

- VPN

- Network services

- Client/server model

- Cisco Courses

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Technologies & Design (TPSIT) third & fourth year:

- Information coding
- O.S. classification and managment
- File system
- Thread
- Processes & resources
- Security & Environment laws application

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Technologies & Design (TPSIT) fifth year:

- Network programming
- Socket
- Client/server model
- Simple Communication protocols design
- Simple services oriented applications

ITT - Istituto Tecnico Tecnologico

Field of studies: Computer Science an Telecommunication:

specialization: Computer Science

Project Managment & Entrepreneurship fifth year

- Product life cycle,

- Specific entrepreneurship technics (better with a real company)

- Job security

- Quality Certifications

ITT - Istituto Tecnico Tecnologico Field of studies: Computer Science an Telecommunication:

specialization: Telecommunications

Computer science: third & fourth year:

- Algorithms design, implementation & comparison with different data structures

- Text file management

- Static web pages management.

- Computer science application developing also database web based)

- Security & Environment laws application

Considerations

You have to take account of

A huge variety of

attitudes,

targets &

environments

Reflections

You must have

Great **flexibility**

Great **adaptability**

Capability to use a **large variety of tools** (that change very fast!)

Great willingness in **continuous vocational training** (most is self training)

Abilities to develop

- Continuous training
- Select the right support software
- Select the right sources like books, articles, web sites attention: they became unsuitable and old very fast)
- Use of e-learning tools
- Use of external certifications (generally updated)

- **Capability of relationshipwith collegues**
- **Practical activities (work in laboratory)**
- **Relation with territory.**
- **Be brought up to speed with current legislation**
- **Have languistic proficiency (like CLIL)**