

INFORMATION AND COMMUNICATION TECHNOLOGY

# IT Software Solutions for Business



## WorldSkills Occupational Standards

# WorldSkills Occupational Standards (WSOS)

## Occupation description and WSOS

### The name of the occupation is

IT Software Solutions for Business

### Description of the associated work role(s) or occupation(s)

The rapid pace of globalization over the past decade has been largely driven by developments in Information and Communication Technology (ICT). IT specialists are increasingly in demand in several areas, one of which is providing software solutions for businesses.

The development of software solutions to improve business productivity encompasses many different skills and disciplines. Key to these is an awareness of the fast-changing nature of the industry and the ability to keep up with the rapid pace of change.

IT software solution professionals always work closely with clients to modify existing systems or create new systems. They may modify “off the shelf” software and integrate it into the existing systems. They often work as part of a team of software professionals responsible for the requirement specification, system analysis and design, construction, testing, training, and implementation, as well as maintenance of a business software system.

The tasks performed by IT software solution professionals include but are not limited to the following:

- Review current system and present ideas for improvement, including cost benefit analysis
- Analyse and specify user requirements
- Produce detailed specifications for new systems or for modifications to existing systems
- Develop software systems and test the software solution thoroughly
- Prepare user training materials, train users, and present the software solution to users
- Install, implement, and maintain the software system

IT software solutions professionals can be employed in large, medium, and small enterprises as software engineers, in consulting firms as consultants, and in software houses as contractors.

They can operate in a wide variety of roles including in a development role to tailor-make or customize software solutions, in a supporting role to operate systems, in a business analyst role to provide solutions to simplify and automate routine office and business activities, as well as in a training role to train users in using the application software.

## General notes on the WSOS

The WSOS specifies the knowledge, understanding, and specific skills that underpin international best practice in technical and vocational performance. It should reflect a shared global understanding of what the associated work role(s) or occupation(s) represent for industry and business ([www.worldskills.org/WSOS](http://www.worldskills.org/WSOS)).

The skill competition is intended to reflect international best practice as described by the WSOS, and to the extent that it is able to. The Standard is therefore a guide to the required training and preparation for the skill competition.

In the skill competition the assessment of knowledge and understanding will take place through the assessment of performance. There will only be separate tests of knowledge and understanding where there is an overwhelming reason for these.

The Standard is divided into distinct sections with headings and reference numbers added.

Each section is assigned a percentage of the total marks to indicate its relative importance within the Standards. This is often referred to as the “weighting”. The sum of all the percentage marks is 100. The weightings determine the distribution of marks within the Marking Scheme.

Through the Test Project, the Marking Scheme will assess only those skills that are set out in the Standards Specification. They will reflect the Standards as comprehensively as possible within the constraints of the skill competition.

The Marking Scheme will follow the allocation of marks within the Standards to the extent practically possible. A variation of up to five percent is allowed, provided that this does not distort the weightings assigned by the Standards.

# WorldSkills Occupational Standards

Section	Relative importance (%)
<b>1 Work organization and management</b>	<b>5</b>

The individual needs to know and understand:

- The principles and practices that enable productive teamwork
- The principles and behaviour of systems
- The aspects of systems that contribute to sustainable products, strategies, and practices
- How to take initiatives and be enterprising in order to identify, analyse, and evaluate information from a variety of sources

The individual shall be able to:

- Plan each day's production schedule according to available time and take into account time limitations and deadlines
- Apply research techniques and skills to keep up-to-date with the latest industry guidelines
- Review own performance against the expectations and needs of clients and organizations

<b>2 Communication and interpersonal skills</b>	<b>5</b>
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The individual needs to know and understand:

- The importance of listening skills
- The necessity of using discretion and confidentiality when dealing with clients
- The importance of resolving misunderstandings and conflicting demands
- The importance of establishing and maintaining customer confidence and productive working relationships
- The value of written and oral communication skills
- The importance of thoroughly documenting developed solutions

The individual shall be able to:

- Use literacy skills to:
  - Follow documented instructions from supplied guides
  - Interpret workplace instructions and other technical documents
  - Interpret and understand systems specification documents
  - Keep up-to-date with latest industry guidelines
- Use oral communication skills to:
  - Discuss and offer suggestions regarding system specifications
  - Keep clients updated regarding systems' progress
  - Negotiate with clients regarding project budgets and timelines
  - Gather and confirm clients' requirements

Section	Relative importance (%)
<ul style="list-style-type: none"> <li>• Present proposed and final software solutions</li> <li>• Use written communications skills to: <ul style="list-style-type: none"> <li>• Documents and demonstrates solutions by developing documentation, flowcharts, layouts, diagrams, charts, code comments and clear code.</li> <li>• Keep clients updated regarding systems' progress</li> <li>• Confirm that created applications meet original specifications and obtain user sign-off for completed systems</li> </ul> </li> <li>• Use team communication skills to: <ul style="list-style-type: none"> <li>• Collaborate with others to develop required outcomes</li> <li>• Contribute to group problem solving</li> </ul> </li> <li>• Use project management skills to: <ul style="list-style-type: none"> <li>• Prioritize and schedule tasks</li> </ul> </li> <li>• Allocate resources to tasks.</li> </ul>	
<b>3 Problem solving, innovation, and creativity</b>	<b>10</b>

The individual needs to know and understand:

- The common types of problem which may occur within software development
- The common types of problem which may occur within a business organization
- Diagnostic approaches to problem solving
- Trends and developments in the industry including new platforms, languages, conventions, and technical skills

The individual shall be able to:

- Use analytical skills to:
  - Synthesize complex or diverse information
  - Determine the functional and non-functional requirements of specifications
- Use investigation and learning skills to:
  - Obtain user requirements (e.g. interviews, questionnaire, document search and analysis, joint application design, and observation)
  - Research encountered problems independently
- Use problem-solving skills to:
  - Identify and resolve problems in a timely manner
  - Gather and analyse information skilfully
  - Develop alternatives for decision making, select the most appropriate alternatives and produce the required solutions

Section	Relative importance (%)
<b>4 Analysis and design of software solutions</b>	<b>25</b>

The individual needs to know and understand:

- The importance of considering all possible options and deriving the best solution based on sound analytical judgment and clients' best interests
- The importance of using system analysis and design methodologies (e.g. Unified Modelling Language, Model-View-Control (MVC) software framework, Design Patterns)
- The need to be up to date with new technologies and able to make judgements about the appropriateness of adopting them
- The importance of optimizing systems design with an emphasis on modularity and reusability
- The importance of the full software development life cycle, including coding standards, code reviews, source control management, build processes, testing, and operations

The individual shall be able to:

- Analyse systems using:
  - Use Case modelling and analysis (e.g. Use Case Diagram, Use Case Description, Actor Description, Use Case Package)
  - Structural modelling and analysis (e.g. Object, Class, Domain Class Diagram)
  - Dynamic modelling and analysis (e.g. Sequence Diagram, Collaboration Diagram, State Diagram, Activity Diagram)
  - Data modelling tools and techniques (e.g. Entity Relationship Diagram, Normalization, Data Dictionary)
- Design systems using:
  - Class Diagram, Sequence Diagram, State Diagram, Activity Diagram
  - Object design and package
  - Relational or object database design
  - Human-computer interface design
  - Security and controls design
  - Multi-tier application design

Section	Relative importance (%)
<b>5 Development of software solutions</b>	<b>50</b>
<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• The importance of considering all possible options and deriving the best solutions to meet user requirements and clients' best interests</li> <li>• The importance of using system development methodologies (e.g. object-oriented technology)</li> <li>• The importance of considering all normal and abnormal scenarios, and exception handlings</li> <li>• The importance of following standards (e.g. code convention, style guide, user interface designs, managing directories, and files)</li> <li>• The importance of accurate and consistent version control</li> <li>• The Use of existing codes as a basis for analysis and modifications</li> <li>• The importance of selecting the most appropriate development tools from the available options</li> </ul>	
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Develop software solutions by studying information needs, conferring with users, and studying systems flow, data usage, and work processes</li> <li>• Use database management systems to construct, store and manage the data for the required systems</li> <li>• Use latest software development environments and tools to modify existing codes and write new codes of client-server-based software solutions</li> <li>• Evaluate and integrate appropriate libraries and frameworks into the software solutions</li> <li>• Build multi-tier applications</li> <li>• Construct web enabled or native mobile interfaces for client-server-based systems</li> </ul>	
<b>6 Testing software solutions</b>	<b>5</b>
<p>The individual needs to know and understand:</p> <ul style="list-style-type: none"> <li>• Troubleshooting methods for common software applications problems</li> <li>• The importance of thoroughly tested solutions</li> <li>• The importance of documenting testing</li> </ul>	
<p>The individual shall be able to:</p> <ul style="list-style-type: none"> <li>• Plan testing activities (e.g. unit testing, volume testing, integration testing, and acceptance testing)</li> <li>• Design test cases with data and check results of test cases</li> <li>• Debug and handle errors</li> <li>• Report on test processes</li> </ul>	
<b>Total</b>	<b>100</b>

## References for industry consultation

WorldSkills is committed to ensuring that the WorldSkills Occupational Standards fully reflect the dynamism of internationally recognized best practice in industry and business. To do this WorldSkills approaches a number of organizations across the world that can offer feedback on the draft Description of the Associated Role and WorldSkills Occupational Standards on a two-yearly cycle.

In parallel to this, WSI consults three international occupational classifications and databases:

- ISCO-08: (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/>) ILO2512
- ESCO: (<https://ec.europa.eu/esco/portal/home>)
- O\*NET OnLine ([www.onetonline.org/](http://www.onetonline.org/))

This WSOS relates most closely to *Software Developers, Applications*:

<https://www.onetonline.org/link/summary/15-1132.00>,

and *Software Developers*:

<http://data.europa.eu/esco/occupation/f2b15a0e-e65a-438a-affb-29b9d50b77d1>

The following table indicates which organizations were approached and provided valuable feedback for the Description of the Associated Role and WorldSkills Occupational Standards in place for WorldSkills Shanghai 2022.

Organization	Contact name
1C Company (Russia)	Boris Nuraliev, Founder and CEO