



Deputy of training Plan and curriculums office

# Competency Training standard

# Title

# MikroTik Certified Wireless Engineer (MTCWE)

Iran Technical and Vocational **Occupational group** Information Technology(IT)

International code

2523-53-105-1

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Iran Technical and Vocational Training Organization

# **Definitions**:

### Job standard:

The characteristics ' required competencies and abilities for Efficient Performance in work environment is called "the Job standard", and sometimes "The Occupational standard"

### **Training standard:**

The Training Map for achieving the Job's subset Competencies.

# Job title:

Is a set of Tasks and Abilities which is expected from an employed person in the defined level

# Job description:

A statement covering the most important elements of a job, namely the position or title of the job, the duties, job's relation with other jobs in a occupational field, the responsibilities, workplace conditions and required performance standards.

### **Course duration**:

The minimum of time which is required to achieve the training objects.

# Admission requirements:

The minimum of competencies and abilities which are obligatory for a potential admission.

# **Evaluation:**

The process of collecting evidence and judgment about wetter a competency is achieved or not. Include: written examination, practical examination

Required Qualifications for Trainers:

The minimum of Trainer's technical and vocational abilities which the trainer is required to have.

### **Competency:**

The ability of efficient performing a duty in a variety of workplaces conditions

Knowledge:

The minimum set of facts and mental capacities which is necessary for achieving a competency. This can include science, (Mathematics, physics, chemistry or biology), technology or technical. **Skill:** 

The minimum coordination between mind and body for achieving an ability or competency. It normally applied to practical skills.

# Attitude:

A set of emotional behaviors required for achieving a competency and can have non-technical skills and occupational ethics.

# Safety:

The cases which doing or not doing something can cause harm or accident

# **Environmental Consideration:**

A set of consideration about the act which should be done to minimize the environmental damage or pollution.

competency title:

# MikroTik Certified Wireless Engineer(MTCWE)

## competency description:

MTCWE is one of the engineering course of MikroTik. This course is about wireless network and special feature offer by RouterOS

The holder of MTCWE Certification knows wireless networks concepts and protocols, wireless standard, MikroTik wireless tools, MikroTik special Wireless standard, wireless security and wireless troubleshooting.

The holder of MTCRE certification have following proficiency :

- Will have the ability to understand wireless standards
- Will have the proficient knowledge about different parf of a wireless system include wireless card, wireless antenna, and RouterBoard's wireless features
- Will have the ability to understand and use wireless tools
- Will have the ability to understand and implement wireless advance setting on RouterOS
- Will have the ability to understand and implement wireless connection on Layer2 and Layer3
- Will have the ability to understand and implement wireless security
- Will have the ability to understand and implement WDS and mesh protocol
- Will have the ability to understand and implement Nstreme and Nv2 Protocol
- Will have the ability to understand and implement wireless routble shooting

### admission requirements:

minimum degree of education: Post first year of high school

minimum physical and mental ability:-

prerequisite skills: CompTIA Network+ certification - MTCNA Certification

# **Course duration:**

Course duration : 64 hours

# Course Evaluation :(%)

I	Course Evaluation :	(%)	
I	Iran I	echn	ical and Focational
	Number of questions	25	
	Passing score	60%	ig Organization
	Conditional	50-59%	S S Stimethon
	Fail	0-49%	
	Duration	60 Minutes	
	Available Language	English	
	Associated Certification	MTCWE	

# **IRANTVTO Evaluation :(%)**

Written Examination:25% Practical Examination:65% Ethics:10%

- MTCWE degree holders with 2 years experience
- Computer related Bachelor with 2 years experience

## competency training standard

tasks

#### Row Title 1 **Wireless Installations** 2 Wireless Standard 3 **Wireless Tools** 4 Wireless Troubleshooting 5 Wireless Advanced Settings 6 802.11n 7 Wireless Security 8 WDS and MESH 9 Wireless Bridging 10 **Nstreme Protocol** 11 **Nv2 Protocol**

# Iran Technical and Vocational Training Organization

		time			
Title:	theoretical	practical	total		
Wireless Installations	Determined	by the inst	ructor		
				Equip	ments ,tools,
Knowledge ,skill ,attitude ,safety, Environmen	ntal Conside	eration			als,books
Knowledge and Skill:	Dotorm	ined by th	ha	materr	Internet
- Wireless routers		tructor	lie	-	
o RouterBoard Hardware		structor			connection
- Wireless cards				-	MikroTik
					Wiki
- Antenna types				-	Computer
					with at least
Attitude:					2Gbiga byte
Speed and accuracy in doing the right thing					<b>.</b>
Speed and accuracy in doing the right thing					Of RAM
					and any
					version of
Health & Safety:					windows 7
Compliance with safety protection in the w	orkplace			-	One
Environmental Consideration:	l an	d I	, 0(	cat	RouterBoad which have
	<u> </u>			, +	at least one
Compliance with environmental protection	Jrgi	ant	za	<i>t10</i>	wireless card
					for every
					two person

Training standard					
Contents analysis form					
	time				
Title:	theoretical	practical	total		
Wireless Standard	Determine	d by the instr	uctor		
Knowledge ,skill ,attitude ,safety, Env	vironmental (	Considerati	on		ments ,tools, als ,books
Knowledge and Skill:	Determined	l by the ins	tructor	-	Internet
- 802.11 a/b/g/n					connection
- Bands and channel width				_	MikroTik
- Frequencies					Wiki
				-	Computer
Attitude:					with at least
Speed and accuracy in doing the right	thing				2Gbiga byte
					Of RAM
					and any
Health & Safety:	32				version of
Compliance with safety protection in	the workplac	e			windows 7
				-	One
					RouterBoad
Environmental Consideration:					which have
Compliance with environmental prote	cal a	nd	100	cat	at least one wireless card
Training	g Org	gani	iza	tio	for every two person

Training standard

Contents analysis form					
	time				
Title: Wireless Tools	theoretical	practical	total		
whereas roots	Determine	d by the instr	uctor		
Knowledge, skill, attitude, safety, Env		ments ,tools, als ,books			
Knowledge and Skill:	Determined	l by the ins	tructor	-	Internet
- o Wireless Tools + LAB					connection
o Scan				-	MikroTik
o Frequency usage					Wiki
o Spectral Scan/History					
o Snooper				-	Computer
o Align					with at least
o Sniffer					2Gbiga byte
Attitude:					Of RAM
Speed and accuracy in doing the right	thing				and any
					version of
					windows 7
Health & Safety:					One
Compliance with safety protection in	the workplac	e		-	
					RouterBoad
Environmental Consideration:	cal a	nd	Ľo	cat	which have at least one
Compliance with environmental prote	ection	gan	iza	tio	wireless card for every
					two person
				I	

Training standard

time	
Title:	
The:     theoretical     practical     total       Wireless Troubleshooting	
Determined by the instructor	
	Equipments, tools,
Knowledge ,skill ,attitude ,safety, Environmental Consideration	materials, books
Knowledge and Skill:Determined by the instructor	- Internet
- Troubleshooting wireless	connection
clients + LAB	- MikroTik
o Registration table analysis	Wiki
o Ack-Timeout/Distance	
0 CCQ	- Computer
o TX/RX Signal Strength	with at least
o Frames and HW-frames	2Gbiga byte
o Data-rates	Of RAM
Attitude:	and any
Speed and accuracy in doing the right thing	version of
	windows 7
Health & Safety:	- One
Compliance with safety protection in the workplace	RouterBoad
Iran Technical and Vo	which have at least one
Environmental Consideration: Compliance with environmental protection	tio wireless card for every
	two person

Contents analysis form					
	time		-		
Title:	theoretical	practical	total		
Wireless Advanced Settings	Determined	by the instru	ictor		
Knowledge ,skill ,attitude ,safety, Envi	ronmental Co	onsideration	n		ments ,tools, als ,books
Knowledge and Skill:	Determ	nined by the	e	-	Internet
- Advanced Wireless Tab	ins	structor			connection
settings + LAB				_	MikroTik
o HW-retries					Wiki
o HW-protection			$\rightarrow$		
o Adaptive-noise-immunity				-	Computer
- WMM					with at least
- Country regulation settings					2Gbiga byte
- TX-power + LAB	$\mathbf{r}$				Of RAM
- Virtual-AP					and any
Attitude: Speed and accuracy in doing the right t	hing				version of
Speed and accuracy in doing the right t	ining				windows 7
				-	One
Health & Safety:					RouterBoad
Compliance with safety protection in the	ne workplace	nd I	0	cat	which have at least one
Environmental Consideration:	Org	ani.	za	tio	wireless card for every
Compliance with environmental protec	tion				two person

	time				
Title:	theoretical	practical	total		
802.11n	Determined	by the instru	ictor		
Knowledge skill attitude safety. Environmental Consideration					ments ,tools, ials ,books
- 802.11n wireless protocol +		nined by the	e	-	Internet
LAB	ins	structor	1		connection
o Features				-	MikroTik
o Data Rates					Wiki
o Channel bonding				_	Computer
o Frame Aggregation					with at least
o TX-power for N cards					
o Chain settings o Wireless link debugging					2Gbiga byte
Attitude:					Of RAM
Speed and accuracy in doing the right t	hing				and any
speed and accuracy in doing the right t	lillig				version of
					windows 7
Haalth & Cafatry				- 1	One
Health & Safety: Compliance with safety protection in th	ne workplace				RouterBoad
					which have
Environmental Consideration:	al ai	nd I	0	cat	at least one wireless card
Compliance with environmental protec	tion	ani	$\overline{\tau \alpha}$	tin	for every
Training	UIS	cirit.	20	110	two person

Contents analysis form					
	time				
Title:	theoretical	practical	total		
Wireless Security	Determined	by the instru	uctor		
				<b>.</b>	1
Knowledge ,skill ,attitude ,safety, Envi	ronmental Co	onsideratio	n		ments ,tools,
	ľ			materi	als ,books
Knowledge and Skill:	Determ	nined by th	e	-	Internet
- Wireless Security Measures +	ins	structor			connection
LAB				-	MikroTik
o Access Management					Wiki
o Access-List/Connect-List					
o RADIUS				-	Computer
o Authentication					with at least
o Encryption					2Gbiga byte
o EAP					Of RAM
o Management Frame					and any
protection	5				version of
Attitude:	. 7				windows 7
Speed and accuracy in doing the right t	ning				One
				_	
					RouterBoad
Health & Safety:					which have
Compliance with safety protection in the	e workplace	nd I	00	cat	at least one wireless card
Environmental Consideration:					for every
Compliance with environmental protec	tion				two person
r proce					

Training standard

	time				
Title:	theoretical	practical	total		
WDS and MESH	Determined	by the instru	ictor		
Knowledge skill attitude safety. Environmental Consideration					ments ,tools, als ,books
Knowledge and Skill:	Determ	nined by th	e	-	Internet
- Wireless WDS protocol +	ins	structor			connection
LAB				_	MikroTik
o Dynamic/Static WDS					Wiki
o RSTP Bridge					
- Wireless MESH + LAB				-	Computer
o HWMP+ Mesh					with at least
Attitude:	2 1				2Gbiga byte
Speed and accuracy in doing the right t	hing				Of RAM
	7 4				and any
					version of
Health & Safety:					windows 7
Compliance with safety protection in the	ne workplace				One
				-	
Environmental Consideration:	al ai	nd I	0	cat	RouterBoad which have
					at least one
	Urg	ani	za	t10	wireless card
					for every
					two person

	time				
Title:					
Wireless Bridging	theoretical	practical	total		
	Determined	by the instru	ictor		
Knowledge ,skill ,attitude ,safety, Envi	ronmental Co	nsideratio	n	Equip	ments,tools,
Knowledge ,skin ,attitude ,salety, Envi		nsideration	1	materi	als ,books
Knowledge and Skill:	Determ	nined by the	e	-	Internet
- Wireless Transparent Bridge	ins	structor			connection
+ LAB				_	MikroTik
o WDS bridging					Wiki
o AP/Station-WDS					
o Pseudobridge				-	Computer
o MPLS/VPLS tunnel					with at least
Attitude:					2Gbiga byte
Speed and accuracy in doing the right t	hing				Of RAM
	5				and any
	5 4				version of
Health & Safety:					
Compliance with safety protection in the	ne workplace				windows 7
Compliance with safety protection in th				-	One
					RouterBoad
Environmental Consideration:	alar	JT	7	0.00	which have
Compliance with environmental protec	tion	101	00	заt	at least one
				, +	wireless card
Training	Org	ant	ZA	t10	for every
					two person

Contents analysis form					
	time				
Title: Nstreme Protocol	theoretical	practical	total		
	Determined	by the instru	ictor		
Knowledge ,skill ,attitude ,safety, Envi	Knowledge ,skill ,attitude ,safety, Environmental Consideration				
Knowledge and Skill:	Determ	nined by the	e	-	Internet
- MikroTik Wireless Nstreme	ins	structor			connection
Protocol + LAB				_	MikroTik
o Features					Wiki
o Configuration options					
o Nstreme Dual				_	Computer
o Troubleshooting					with at least
Attitude:					2Gbiga byte
Speed and accuracy in doing the right t	hing				Of RAM
					and any
	2				version of
Health & Safety:					windows 7
Compliance with safety protection in the	e workplace			-	One
					RouterBoad
Environmental Consideration:					which have
Compliance with environmental protec	tion] (11	nd I	00	cat	at least one wireless card
Training	Oro	mi	$\overline{7\alpha}$	tio	for every
Training	018	cirit.	20	110	two person

Training standard

Title: Nv2 Protocol       theoretical       practical       total         Determined by the instructor       Equipments ,tools, materials ,books         Knowledge and Skill:       Determined by the instructor       Function         - MikroTik Wireless Nv2       Determined by the instructor       - Internet         Protocol + LAB       - Internet       - One         o Features       - One       - Compliance with safety protection in the workplace       - One         Rttitude:       Speed and accuracy in doing the right thing       - One       - One         Health & Safety:       - One       - One       RouterBoad         Compliance with environmental protection       - One       - One       - One	Contents analysis form					
Nv2 Protocol       theoretical practical total Determined by the instructor       Equipments ,tools, materials ,books         Knowledge ,skill ,attitude ,safety, Environmental Consideration       Equipments ,tools, materials ,books         Knowledge and Skill:       Determined by the instructor       - Internet         - MikroTik Wireless Nv2       instructor       - MikroTik         Protocol + LAB        - MikroTik         o Features           o Configuration options           o Troubleshooting	T:41 or	time				
Determined by the instructorEquipments ,tools, materials ,booksKnowledge and Skill:Determined by the instructor- Internet connection- MikroTik Wireless Nv2instructor- MikroTik 		theoretical	practical	total		
Knowledge ,skill ,attitude ,safety, Environmental Considerationmaterials ,booksKnowledge and Skill:Determined by the instructor- Internet connectionProtocol + LAB o Features o Configuration options o Troubleshooting- MikroTik Wiki- MikroTik WikiAttitude: Speed and accuracy in doing the right thing- Computer with at least 2Gbiga byte- Computer with at least 2Gbiga byteHealth & Safety: Compliance with safety protection in the workplace- One RouterBoad which have at least one		Determined by the instructor				
<ul> <li>MikroTik Wireless Nv2</li> <li>instructor</li> <li>Protocol + LAB</li> <li>o Features</li> <li>o Configuration options</li> <li>o Troubleshooting</li> <li>MikroTik</li> <li>Wiki</li> <li>Computer</li> <li>with at least</li> <li>2Gbiga byte</li> <li>Of RAM</li> <li>and any</li> <li>version of</li> <li>windows 7</li> <li>One</li> <li>RouterBoad</li> <li>which have</li> <li>at least one</li> </ul>	Knowledge, skill, attitude, safety, Environmental Consideration					
Protocol + LAB o Features o Configuration options o TroubleshootingImage: Configuration options o TroubleshootingImage: Computer wikiAttitude: Speed and accuracy in doing the right thingComputer of RAM and any version of windows 7Of RAM and any version of windows 7Health & Safety: Compliance with safety protection in the workplaceOf RAM and any version of windows 7Environmental Consideration: Compliance with environmental protectionImage: Compliance with environmental protection	Knowledge and Skill:	Determ	nined by the	e	-	Internet
<ul> <li>Features</li> <li>Configuration options</li> <li>Troubleshooting</li> <li>Troubleshooting</li> <li>Troubleshooting</li> <li>Computer</li> <li>Wiki</li> <li>Computer</li> <li>With at least</li> <li>2Gbiga byte</li> <li>Of RAM</li> <li>and any</li> <li>version of</li> <li>windows 7</li> <li>One</li> <li>RouterBoad</li> <li>Wiki</li> </ul>	- MikroTik Wireless Nv2	instructor				connection
o Configuration options o TroubleshootingWikiAttitude:Computer with at leastSpeed and accuracy in doing the right thingOf RAM and any version of windows 7Health & Safety: Compliance with safety protection in the workplaceOne RouterBoad which have at least oneEnvironmental Consideration: Compliance with environmental protectionOne which have at least one	Protocol + LAB				-	MikroTik
<ul> <li>Configuration options</li> <li>Troubleshooting</li> <li>Troubleshooting</li> <li>Computer</li> <li>with at least</li> <li>2Gbiga byte</li> <li>Of RAM</li> <li>and any</li> <li>version of</li> <li>windows 7</li> <li>One</li> <li>RouterBoad</li> <li>Which have</li> <li>at least one</li> </ul>						Wiki
Attitude:Speed and accuracy in doing the right thingHealth & Safety:Compliance with safety protection in the workplaceEnvironmental Consideration:Compliance with environmental protection	o Configuration options					
Attitude:2Gbiga byteSpeed and accuracy in doing the right thingOf RAMand anyand anyversion ofwindows 7Compliance with safety protection in the workplace- OneEnvironmental Consideration:RouterBoadCompliance with environmental protectionat least one	o Troubleshooting				-	-
Speed and accuracy in doing the right thingOf RAM and any version of windows 7Health & Safety: Compliance with safety protection in the workplaceof RAM and any version of windows 7Environmental Consideration: Compliance with environmental protectionof RAM and any version of windows 7Environmental Consideration: Compliance with environmental protectionof RAM and any version of windows 7						with at least
Image: Constraint of the second of the first of the fi	Attitude:					2Gbiga byte
Health & Safety: Compliance with safety protection in the workplaceversion of windows 7 - One RouterBoad which have at least one	Speed and accuracy in doing the right thing					Of RAM
Health & Safety: Compliance with safety protection in the workplaceversion of windows 7 - One RouterBoad which have at least one						and any
Compliance with safety protection in the workplace       -       One         RouterBoad       which have         Environmental Consideration:       at least one						•
- One RouterBoad which have at least one						windows 7
Environmental Consideration:which haveCompliance with environmental protectionat least one	Compliance with safety protection in the workplace				-	One
Compliance with environmental protection at least one						RouterBoad
	Environmental Consideration: Compliance with environmental protection				cat	$1 \cap 1 \cap 1 \cap 1$
Iranning Organization for every	Training Organiza				tio	wireless card for every
two person						two person

Equipment & Tools & Materials & Resources (books, site, software...) form mikrotik.com and wiki.mikrotik.com

\*Required quantity for each 15 Trainees

\* One 751 RouterBoared or similar model which support wireless for every two person