

Name	CAM modeling and generating NC code for 3 axis CNC milling machines		
Code			
ECTS	4ECTS		
Location	KTC Kragujevac, Univerzitet u Kragujevcu, Mašinski fakultet, Sestre Janjić 6, 34000 Kragujevac, Srbija		
Trainer/s	Marko Takovac (CV attached)		
Purpose	Making participants able to analyze and design production technology of simple and complex shapes on 3 axis CNC milling machines; generating NC code and understanding communication between computer and control unit of machine.		
Recommended entry level	4th, 6th, 7th level of professional qualification		
Special requirements	Basic knowledge about 2D and 3D CAD modeling. Basic knowledge about milling technology and milling cutting tools.		
Duration	40 hours		
General objectives	Participants who pass this training should be able to: <ul style="list-style-type: none"> ⤴ Analyze 3D model for production according to it's technological feasibility ⤴ Define manufacturing strategy and tool paths ⤴ Generate NC ⤴ Get practical knowledge applicable in industrial praxis. 		
Topics	1. Introduction to software environment and explanation of CAM software function principle 2. Learning rough machining strategy 3. Learning finishing machining strategy 4. Toolpaths modification, defining boundaries 5. Generating NC code and working with 2D shapes 6. Customizing CAM software 7. Application of new knowledge through practical examples		
Specific learning outcomes in topics	Topic 1:	Number of hours	2
	Participants should be able to: <ul style="list-style-type: none"> ⤴ Understand CAM software function principle ⤴ Import working model and analyze it ⤴ Define basis and axis system 		
	Topic 2:	Number of hours	4
	Participants should be able to: <ul style="list-style-type: none"> ⤴ Choose rough machining strategy ⤴ Generate toolpaths ⤴ Simulate machining with different visualization tools 		
	Topic 3:	Number of hours	8
	Participants should be able to: <ul style="list-style-type: none"> ⤴ Choose finishing machining strategy ⤴ Generate toolpaths 		
Topic 4:	Number of hours	8	
Participants should be able to: <ul style="list-style-type: none"> ⤴ make modification on generated toolpaths ⤴ Define rapid moves, and leads and links ⤴ Make pattern with toolpaths ⤴ Define boundaries 			
Topic 5:	Number of hours	8	
Participants should be able to: <ul style="list-style-type: none"> ⤴ Manipulate with wireframe models ⤴ Use 2D machining strategies ⤴ Generate NC code 			

	Topic 6: Participants should be able to: <ul style="list-style-type: none"> ⤴ Customize software according to their company needs ⤴ Make their own toolpath templates ⤴ Generate documentation 	Number of hours 2						
	Topic 7: Participants should be able to: <ul style="list-style-type: none"> ⤴ Through practical examples autonomously import 3D models, choose optimal machining strategy, generate toolpaths, NC code, and documentation. 	Number of hours 8						
Portfolio assessment	<p>Trainer evaluates level of succes in overcoming the training of each student, through assessments exercises and testing.</p> <p>Rating exercise: Exercise trainer defined on the basis of which can be implemented to assess the degree of learning outcomes. The exercises can be performed individually or in team, in groups of 2-5 trainees.</p> <p>Evaluation:</p> <table style="margin-left: 40px;"> <tr> <td>Meet</td> <td>50 - 64%</td> </tr> <tr> <td>Successful</td> <td>65 - 79%</td> </tr> <tr> <td>Excellent</td> <td>80 - 100%</td> </tr> </table> <p>Performance criteria and the percentage of representation of these techniques in the evaluation module will be given later.</p>		Meet	50 - 64%	Successful	65 - 79%	Excellent	80 - 100%
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