



رقم البند	اسم المادة ومواصفاتها	الوحدة	الكمية المطلوبة	الماركة	المنشأ	مدة التسليم	الأسعار بالدينار الأردني			
							السعر الإجمالي		السعر الإفرادي	
							د	ف	د	ف
1	1. Real-time network simulator (RTNS)	عدد	1							
	2. Software license to run the models	عدد	1							
	3. Distributed Energy Resources (DER) Emulator	عدد	3							
	4. Grid Emulator PHIL	عدد	1							
2	Desktop PCs For data acquisition and system monitoring	عدد	3							

المواصفات الفنية الدقيقة لكل مادة تابعة لنظام المحاكى المطلوب موضحة حسب الجدول التالي :-

البند (الأجهزة) Item (Equipment)	الوصف Description	العدد
Real-time network simulator (RTNS)	<ul style="list-style-type: none"> <li>The RTNS must offer computation capability in order to run power systems models in real-time</li> <li>The real-time simulator must offer a set of standard I/Os (Analogue Input-output channels, [-15 V; + 15 V], 16-bits resolution, Digital Input-output channels (0-30 V)</li> <li>The RTNS must be controlled by dedicated software modules define and manage the simulation environment. These software modules include the real-time operating system and a function to convert Simulink models into an executable simulator model file.</li> <li>The modeling environment must be based on Matlab/Simulink.</li> <li>The modeling environment must involve dynamic simulation of power systems in phasor mode and be used for the testing and integration of energy management systems.</li> <li>The System must be able to simulate microgrid models with 500 buses in minimum at 10 ms in real-time.</li> <li>The system must include a set of models ready to be used:</li> </ul>	1



	<ul style="list-style-type: none"> <li>• Grid model / Microgrid Model</li> <li>• Distributed Energy Resources models. These Distributed Energy Resources can represent: <ul style="list-style-type: none"> <li>- Wind turbine</li> <li>- Solar system</li> <li>- Battery with discharging and charging capability.</li> <li>- AC Loads</li> </ul> </li> <li>• The grid/microgrid model must: <ul style="list-style-type: none"> <li>- Offer fault capability</li> <li>- Offer islanded mode capability</li> <li>- Be controllable through a user-friendly GUI.</li> <li>- Be open for modification by the user.</li> </ul> </li> <li>• The DER models must <ul style="list-style-type: none"> <li>- Offer fault capability</li> <li>- Be selected and configured through a GUI.</li> <li>- Be based on MATLAB/Simulink/Simscape Power Systems</li> <li>- Be open for modification by the user.</li> </ul> </li> </ul> <p><b>Note: Integrated renewable energy module should include real-time network simulator (RTNS) to allow simulating a real network and investigating real models.</b></p> <p><b>In general, the module should allow a fully controlled (based on voltage and frequency) low voltage grid, fully controlled emulators, fully instrumented equipment and Software programs.</b></p>	
Software license	Software license to run the models MATLAB/Simulink.	1
Distributed Energy Resources (DER) Emulator	<ul style="list-style-type: none"> <li>• Minimum 5 kVA</li> <li>• Voltage range of 380/220 V three/single phase system</li> <li>• 100 % sinking capability (four-quadrant operation)</li> <li>• Maximum Total harmonic distortion (THD) of 0.5 %</li> </ul>	3



	<ul style="list-style-type: none"><li>• Feedback of three voltages and three current measurements to real-time network simulator.</li><li>• Dynamic response less than 5 <math>\mu</math>s.</li></ul>	
Grid Emulator PHIL	<ul style="list-style-type: none"><li>• Minimum 5 kVA.</li><li>• Voltage range of 208 - 253 Vac per phase.</li><li>• 100% sinking capability (four-quadrant operation).</li><li>• Minimum of 5 kHz bandwidth at -3db.</li><li>• Maximum Total harmonic distortion (THD) of 0.5 %.</li><li>• Feedback of three voltages and three current measurements to real-time networksimulator (RTNS)</li><li>• Dynamic response less than 5 <math>\mu</math>s.</li><li>• Direct connection to the micro grid Bus (AC). No additional hardware to connect the DERto the 3-phase bus.</li></ul>	1
Desktop PCs For data acquisition and system monitoring	<ul style="list-style-type: none"><li>• Processor – quad core 2.4 GHz+ (i7 series Intel processor or equivalent AMD)</li><li>• RAM – 16 GB or more</li><li>• Hard Drive – 256 GB or larger solid-state hard drive</li><li>• Graphics Card – any with Display Port/HDMI</li><li>• Monitor – 19" widescreen LCD with Display Port/HDMI</li><li>• Operating System – Windows 10 Professional edition.</li></ul>	3

**شروط خاصة للعطاء:**

-كفالة صيانة لمدة 3 سنوات.

-دعم فني لمدة 24 شهر من تاريخ استلام لجنة الاستلام في الجامعة.

الاسم :

التوقيع :

الختم :