



澳門特別行政區政府  
 Governo da Região Administrativa Especial de Macau  
 人才發展委員會  
 Comissão de Desenvolvimento de Quadros Qualificados

## Professions in Short Supply Applicable to the Advanced Professionals Programme for the High-Tech Industry

Professional Field	Professional Sub-field	Professions in Short Supply
Design, research and application development of microelectronic integrated circuits	Design, research and application development of chips	<ul style="list-style-type: none"> <li>• Professionals in integrated circuit chip design</li> <li>• Professionals in electronic design automation (EDA) of integrated circuit chips</li> <li>• Process engineers</li> <li>• Process integration engineers</li> <li>• Fabrication engineers</li> <li>• Chip packaging engineers</li> <li>• Chip test engineers</li> </ul>
	Design, research and application development of electronic components	<ul style="list-style-type: none"> <li>• Professionals in electronic component design and technology development</li> </ul>
Research and application development of information and communications technology	Research and application development of information technology	<ul style="list-style-type: none"> <li>• Professionals in research and application development of cloud computing technology</li> <li>• Professionals in research and application development of Internet</li> </ul>



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Professional Field	Professional Sub-field	Professions in Short Supply
		<p>of Things technology</p> <ul style="list-style-type: none"> <li>• Professionals in research and application development of big data technology</li> <li>• Professionals in research and application development of blockchain technology</li> <li>• Professionals in research and application development of algorithmic technology</li> <li>• Professionals in cyber security product development</li> <li>• Professionals in data security product development</li> <li>• Professionals in information security product development</li> <li>• Professionals in research and application development of application system technology</li> <li>• Professionals in research and application</li> </ul>



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Professional Field	Professional Sub-field	Professions in Short Supply
		development of network information service technology <ul style="list-style-type: none"> <li>Professionals in research and application development of software and system technology</li> <li>Professionals in research and application development of quantum computer system technology</li> <li>Professionals in research and application development of brain-inspired computer system technology</li> <li>Professionals in research and application development of system simulation design technology</li> </ul>
	Application development of digital reality technology	<ul style="list-style-type: none"> <li>Professionals in application development of virtual reality (VR) technology</li> <li>Professionals in application development of augmented reality</li> </ul>



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Professional Field	Professional Sub-field	Professions in Short Supply
		(AR) technology <ul style="list-style-type: none"> <li>• Professionals in application development of mixed reality (MR) technology</li> <li>• Professionals in application development of extended reality (XR) technology</li> </ul>
	Research and application development of communications technology	<ul style="list-style-type: none"> <li>• Professionals in research and application development of communications technology</li> <li>• Professionals in wireless access technology development</li> <li>• Professionals in optical transmission technology development</li> <li>• Professionals in mobile communications technology development</li> <li>• Professionals in transmission network technology development</li> <li>• Professionals in communications technology project</li> </ul>



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Professional Field	Professional Sub-field	Professions in Short Supply
		design <ul style="list-style-type: none"> <li>• Professionals in automated scheduling for intelligent systems</li> </ul>
Research and application development of artificial intelligence technology	Research and application development of artificial intelligence technology	<ul style="list-style-type: none"> <li>• Professionals in research and application development of artificial intelligence technology</li> <li>• Professionals in artificial intelligence algorithms</li> <li>• Professionals in artificial intelligence frameworks</li> <li>• Professionals in research and application development of big data technology</li> <li>• Professionals in big data model design</li> <li>• Professionals in application development of human-computer interaction designs</li> <li>• Professionals in application development of user experience designs</li> <li>• Professionals in application development</li> </ul>



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		of 3D model designs
Research and application development of engineering technology	Application development of autonomous and unmanned intelligent engineering technology	<ul style="list-style-type: none"> <li>Professionals in application development of mechanical engineering technology with autonomous and unmanned intelligence</li> <li>Professionals in application development of automation technology with autonomous and unmanned intelligence</li> <li>Professionals in application development of algorithmic technology</li> </ul>
	Research and application development of low-altitude aircraft engineering technology	<ul style="list-style-type: none"> <li>Professionals in research and application development of low-altitude aircraft flight system technology</li> <li>Professionals in research and analysis of low-altitude aircraft flight systems</li> <li>Professionals in low-altitude aircraft design</li> </ul>



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		<ul style="list-style-type: none"> <li>Professionals in application development of low-altitude aircraft technology</li> </ul>
Research and application development of innovative materials	Research and application development of innovative materials	<ul style="list-style-type: none"> <li>Professionals in research and application development of innovative materials</li> </ul>
Research and application development of new energy	Research and application development of new energy	<ul style="list-style-type: none"> <li>Professionals in research and application development of new energy</li> <li>Professionals in automated scheduling for intelligent energy systems</li> </ul>
Research and application development of environmental science technology	Research and application development of environmental science technology	<ul style="list-style-type: none"> <li>Professionals in research and application development of environmental science technology</li> </ul>
Development of operating systems, compilers and underlying software	Development of operating systems, compilers and underlying software	<ul style="list-style-type: none"> <li>Professionals in operating system development</li> <li>Professionals in embedded system development</li> <li>Professionals in compiler development</li> </ul>



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		<ul style="list-style-type: none"> <li>• Professionals on integrated development environments (IDE)</li> <li>• Professionals on performance toolchains</li> <li>• Professionals in underlying software development</li> </ul>
Research and application development in maritime engineering	Research and application development in maritime engineering	<ul style="list-style-type: none"> <li>• Professionals in research and application development in river and costal/harbour engineering</li> <li>• Professionals in research and application development in hydraulic engineering</li> <li>• Professionals in research and application development in naval architecture</li> <li>• Professionals in research and application development in marine navigation technology</li> </ul>
Teaching, research and scientific research management in high	Teaching and research in high technology	<ul style="list-style-type: none"> <li>• Teaching and research personnel in high technology</li> <li>• Technology transfer professionals in high</li> </ul>





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technology		technology <ul style="list-style-type: none"> <li>Professionals in experimental technology testing in high technology</li> </ul>
	Scientific research management	<ul style="list-style-type: none"> <li>Professionals in research project management</li> <li>Professionals in research platform management</li> <li>Professionals in research achievement management</li> </ul>
High-tech enterprise operations, scientific research achievement transformation and product commercialisation	High-tech enterprise operations, scientific research achievement transformation and product commercialisation	<ul style="list-style-type: none"> <li>Professionals in business development of technology enterprises</li> <li>Professionals dealing with intellectual property rights protection and management for technology enterprises</li> <li>Professionals in investment, financing, acquisition and mergers with technology enterprises</li> <li>Professionals in sales and marketing of scientific research products</li> <li>Professionals in technology patent</li> </ul>



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Professional Field	Professional Sub-field	Professions in Short Supply
		application • Managers in achievement transformation or product commercialisation for technology enterprises

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*Disclaimer: The official Dispatch of the Chief Executive is available in Chinese and Portuguese. This English translation is intended solely for reference purposes and has no legal effect. In case of any discrepancies or differences between the official texts and the English translation, the former shall prevail.*