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2021 ¤ 8 8

# 测控技术与仪器专业培养方案

## 一、培养目标

\ C J ) «5, 8 3PCX8Ÿ- È ç Ã ª Ã ƒ Ã5¾Ã ã ˜ M’ …È7- X#q0; J 1yN¶ þ » ˜ >˜ ú ª 7-#{ ×3+5 ,´ 6 À ÃAîAÑÃ 0 ÃF >| ú 1Ñ‡61y Œ´ ç ª ƒ 5¾ã ˜ M’ ..,´ Ä+X» 0; ° _ ê } ¼n J k y Õ* ê Ä

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Ä1 Å § 9 'Ï 4óF +X 0; *6. Aö¼#{ × C J . Aö@ ã#q0; J 1yN¶ ,´ ˜ >˜ Ã ª 7-#{ ×1y 0; L NÈ; 7- Ë Ä

Ä2 Å § 9 F +X)à § ¼x F ° _ ) #q0; J 1yN¶ ,´ ˜ >˜ Ã ª 7-#{ ×3+5 F >| K à W6 À ÃAî AÑÃLö @¼= Ñ,´ 7- Ë Ä

Ä3 Å § 9 !“ .ž ,´ F+|?ò¼ê +Œ?òÈ § 7 9 x ,´ "Ï FJ Ã>˜Eî7- Ë úN© 1Ñ‡67- Ë È 98Ÿ- ,´ LO• Œ2î /Ž È7- X 0; Î D%} 5, 863<•# » Ã)ß ³ Ã/n J Ã4ÿ#~1y é M’ 3PÄ

Ä4 Å § 9 ¯LD´ - Lu?öGþÈ k ØF2Ä = Ý F ,´ - µ F ’ ï ¼)ß ³ È § 7 4ø+O– • ,´ 7- Ë È7- O7 + = Ý ..,´ #{ × ° _N¶ ŒÄ

## 二、专业方向

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## 三、毕业要求

i ž \ C J ê } ) «- 7 ú A Q#{ × ° _ > ˜ C J J ¤ ,´ ê } ) «4ÿP½È þF2Ä/n J ..,´ M0r * È >.ž)àLf!å \ C J ,´ " J 7- Ë?±"r ú ¦ 7 7&é6@ ² ; Ö

| " J 7- Ë?±"r | 7 7&é |
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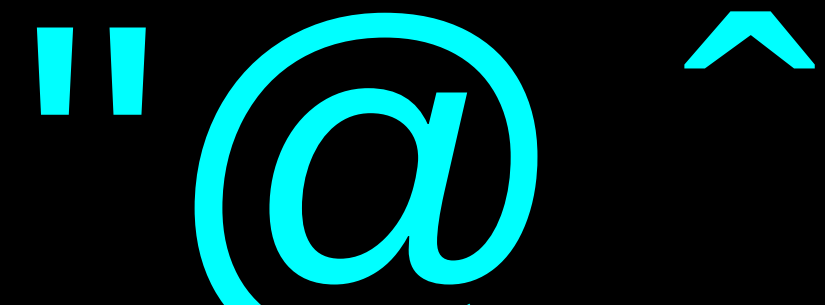
| " J ?±"r 1 Ö<br>7- O Ä+X – Ã8 'f 0 –1yN¶ ,´ *6Aê > é # ú 0; * .p ¼#{ × C J . AöÃ° 7- > § È AîAÑ© j E- ƒ È@ ã#q 0; J 1yN¶ ˜ >˜ Ã#{ ×1y-( £ = r 0; L NÈÄ | 1-1.5, 8F +X – Ã8 'f 0 – Ã 0; * .p ¼C J . AöÈ )à >>˜F 08\ 0; L NÈÄ |
| | 1-2.4ÿE÷8*6,´ 1° F ÃØ*6 ¼6 À È5, 8 Ä+X#{ × C J J é M’,´ . AöÈ* 0û ˜ >˜>õž X ˜ +O- ˜ O,´ – Q » ¦ "r @ Ä |
| | 1-3. ¼ ˜ >˜ Ã#q0; J 1yN¶ C J . AöÈ¦ 7- O+X¾Ø%ÐÃ 6 À ˜ >˜ Ã#q0; J 1yN¶ ,´ = r 0; L NÈÄ |
| | 1-4.7- O5, 8F +X – Ã8 'f 0 – Ã 0; * .p ¼C J . AöÈ@ ã ˜ >˜ Ã#q0; J 1yN¶ ,´ = r 0; L NÈÄ |
| " J ?±"r 2 Ö<br>7- O Ä+X – Ã8 'f 0 – ¼ 0; 0 –,´ * \ Ï *6 ÈAö[ Ã>˜Eî Ã¦ FJE÷· )^ .D 0¦ • 6 À#q0; J 1yN¶ ,´ = r #{ × 0; L NÈÈ 9ç Ç 9 x 5 AêÄ | 2-1.7- OF +X – Ã8 'f 0 – ¼ 0; 0 –,´ * \ Ï *6 ÈAö[ ˜ >˜ Ã#q0; J 1y-( £N¶ = r 0; L NÈ] ,´ £K^)ß8² Ä |
| | 2-2.7- OFJE÷#{ × ° _ * .p Ï *6 ¼ – Q » 1y é # !“ .ž >˜Eî ˜ >˜ Ã#q0; J 1y-( £N¶ ,´ = r 0; L NÈÄ |
| | 2-3.7- OF +X 0; * .p ¼C J . AöÈFJE÷· )^ .D0¦ • 6 À ˜ >˜ Ã#q0; J 1y-( £N¶ ,´ = r 0; L NÈÈ¦ 9ç Ç 9 x 5 AêÄ |
| " J ?±"r 3 Ö<br>7- OJ¸ ) ˜ >˜ Ãª 7- ð#{ > × f 1y | 3-1. ¶@ ¡ ý ˜ >˜ Ã#q0; J 1yN¶ 0; L NÈîAÑ 7 ¼° _ é x ,´ 4/ý 3PÈ7- O * ˜ >˜ Ã#q0; J 1y-( £N¶ = r 0; L NÈ; @ ã é x Ä |



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| Requirement 6 Ö<br>Based on the relevant background knowledge of process industry and other fields, reasonably analyze the intelligent detection and control engineering practice and complex engineering problem solutions, evaluate their impact on society, health, safety, law, and culture, and understand the responsibilities of measurement and control professional engineers. | 6-1. Be able to understand and use the technical standards and industrial norms related to instruments and related industries in internship, professional practice, and social practice, and respect the intellectual property rights and laws and regulations in related fields. |
| | 6-2. Be able to evaluate the impact of engineering practice and complex engineering problem solutions on society, health, safety, law, and culture, and understand the responsibilities in relevant engineering practice. |
| Requirement 7 Ö<br>Be able to understand and evaluate the impact of the engineering practice of intelligent measurement and control complex engineering problems in the field of process industry on the sustainable development of environment and society. | 7-1. Know and understand the concept and connotation of environmental protection and sustainable development. |
| | 7-2. Be able to consider the sustainability of engineering practice in instrumentation, process industry and other related fields from the perspective of environmental protection and sustainable development, evaluate the possible impact on human and environment in the whole cycle of Engineering in instrumentation, process industry and other related fields, and reduce hidden dangers and impacts. |
| Requirement 8 Ö<br>Have humanities and social science literacy, sense of social responsibility, be able to understand and abide by the engineering professional ethics and norms in the process industry and other fields of instrumentation, intelligent measurement, and control engineering practice, and fulfill the responsibility. | 8-1. We should have a correct world outlook, values, and outlook on life, have a good quality of Humanities and Social Sciences and a sense of social responsibility, establish, and practice the socialist core values, clarify the responsibilities and missions of individuals as builders and successors of the socialist cause, and understand China's national conditions. |
| | 8-2. Understand the engineer's professional ethics and norms of honesty, justice, and integrity, and be able to abide by and take responsibility in the engineering practice of instrumentation, process industry and other related engineering fields. |
| Requirement 9 Ö<br>Be able to play the role of individual, team member and leader in a multidisciplinary team. | 9-1. In the field of instrumentation and process industry engineering practice team, be able to communicate and work with multidisciplinary members, and be able to complete corresponding tasks independently or cooperatively. |
| | 9-2. Understand the roles of team members and leaders in the field of instrumentation and process industry, and have the ability of team leadership. |
| Requirement 10 Ö<br>Be able to effectively communicate with peers in the industry and the public on complex engineering issues such as instrumentation and intelligent measurement and control, including writing reports and design manuscripts, making statements, clearly expressing, or responding to instructions, and have a certain international vision, and be able to communicate and exchange in a | 10-1. Be able to effectively communicate with peers in the industry and the public in terms of oral and written expression, interpersonal communication, electronic and multimedia communication on professional issues in instrumentation, process industry and other related engineering fields. |
| | 10-2. Have the ability of foreign language communication, have a certain international vision, be able to communicate and exchange in the cross-cultural background. |

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| cross-cultural context. | |
| Requirement 11 Ö<br>Understand and master the engineering management principles and economic decision-making methods of intelligent measurement and control engineering, and be able to apply them in multidisciplinary environment. | 11-1. Understand and master the management and economic decision-making methods involved in instrumentation, process industry and other related projects. |
| | 11-2. Able to apply engineering management principles and economic decision-making methods to effectively analyze and comprehensively evaluate complex engineering problems in instrumentation and process industry, and put forward economic and reasonable solutions. |
| Requirement 12 Ö<br>Have the consciousness of self-learning and lifelong learning, have the ability of continuous learning and adapting to development. | 12-1. Be able to have a correct understanding of the necessity of self-exploration and lifelong learning, and have the consciousness of autonomous learning. |
| | 12-2. Fully aware of the rapid development of intelligent instruments, process industry and other related engineering fields, as well as the importance of self-learning and lifelong learning, with good psychological and physical quality to adapt to various tasks in the work. |

Professional graduation requirements should be able to support the achievement of training objectives. Establish the relationship matrix of graduation requirements to support the realization of training objectives.

**The relationship between graduation requirements and educational objectives**

| Graduation Requirements | Educational Objectives | | | |
|---|---|---|---|---|
| | Educational Objectives 1 | Educational Objectives 2 | Educational Objectives 3 | Educational Objectives 4 |
| 1 ÖEngineering Knowledge | √ | | | |
| 2 ÖProblem Analysis | √ | | | |
| 3 ÖDesign/Development Solutions | √ | √ | | |
| 4 ÖResearch | | √ | | |
| 5 ÖUse Modern Tools | | √ | | |
| 6 ÖEngineering and Society | | √ | √ | |
| 7 ÖEnvironment and Sustainable Development | | | √ | |
| 8 ÖCareer Planning | | | √ | |
| 9 ÖIndividuals and Teams | | | √ | |
| 10 ÖCommunicate | | | √ | √ |
| 11 ÖProject Management | | √ | | √ |
| 12 ÖLifelong Learning | | | | √ |

## IV. Major Subject

Instruments Science and Technology.

## V. Core Courses

Fundamentals of circuit analysis, Analog electronic technology, Digital electronic technology, Computer Control Technology, The Principle of Automatic Control, Error Theory and Data Processing, Sensor Principle and Application iont

| B.0; 2«[ Course Type | B.0; WCX Course Nature | | B.0; ' Course Code | B.0; =0 Course Name | – 6 Cre. | k – & T.C.H | – & 6G} Credit Hour Distribution | | | | 4 – O˜ – & 6G} Weekly Hours Per Semester | | | | | | | | 7# Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AâB. Lec. | Î P¼ Exp. | : j Pro. | B. F Î D% Pra. | 0 1st | ¼ 2nd | 9 3rd | 4th | Ä 5th | • 6th | 3 7th | › 8th | |
| FJAö‰âB. General Education | õ Compulsory | FB 2« Foreign Language Courses | | W– FB III Ä9!B B >˜Eî > Ô#qÅ<br>‖ College English III ÄEnglish Oral Expression and Communication Å | 3.0 | 48 | 48 | | | | | | 3 | | | | | | |
| | | | | W– FB III ÄD · F ÔLuÅ<br>‖ College English III ÄIntercultural Communication Å | 3.0 | 48 | 48 | | | | | | 3 | | | | | | |
| | | | | W– FB III Ä9!B É Œ>˜Eî > Ô#qÅ<br>‖ College English IIIÄEnglish Writing Expression and Communication Å | 3.0 | 48 | 48 | | | | | | 3 | | | | | | |
| | | | 0241003401 | W– FB IV*<br>‖College English IV* | 3.0 | 48 | 48 | | | | | | | 3 | | | | | ÄF90 |
| | | | | W– FB IV ÄF Lf9!B Å<br>‖ College EnglishIV ÄAdvanced English CET 6-Orientated Å | 3.0 | 48 | 48 | | | | | | | 3 | | | | | |
| | | | | W– FB IV Ä9!B B >˜Eî > Ô#qÅ<br>‖ College EnglishIV ÄEnglish Oral Expression and Communication Å | 3.0 | 48 | 48 | | | | | | | 3 | | | | | |
| | | | | W– FB IV ÄD · F ÔLuÅ<br>‖ College English IV ÄIntercultural Communication Å | 3.0 | 48 | 48 | | | | | | | 3 | | | | | |
| | | | | W– FB IV Ä9!B É Œ>˜Eî > Ô#qÅ<br>‖ College English IV ÄEnglish Writing Expression and Communication Å | 3.0 | 48 | 48 | | | | | | | 3 | | | | | |
| | | AÑ1Çj 2« Computer Courses | 1511372002 | C B @0; ¿AîAÑ<br>‖C Programming Language | 2.5 | 44 | 32 | | 12 | | | 2 | | | | | | | |
| | | | 1513992002 | Python B @0; ¿AîAÑ<br>‖Python Programming Language | 2.0 | 36 | 24 | | 12 | | | 2 | | | | | | | |
| | | Ë » ¹ ˜ 2« Military and Safety Courses | 0710081001 | Ë » *6Aê<br>‖Military Theory | 1.0 | 16 | 16 | | | | | 2 | | | | | | | |
| | | | 1510261302 | ¹ ˜ ‰6â<br>‖Safety Education | 1.0 | 16 | 16 | | | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | |

| B.0; 2«[ Course Type | B.0; WCX Course Nature | | B.0; ' Course Code | B.0; =0 Course Name | – 6 Cre. | k – & T.C.H | – & 6G} Credit Hour Distribution | | | | 4 – O˜ – & 6G} Weekly Hours Per Semester | | | | | | | | 7# Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AâB. Lec. | Î P¼ Exp. | : j Pro. | B. F Î D% Pra. | 0 1st | ¼ 2nd | 9 3rd | 4th | Ä 5th | • 6th | 3 7th | › 8th | |
| FJAö%6âB. General Education | õ Compulsory | ã Ø ƒ 6â2« Labor and Sport Education | 2640021001 | ã Ø %6â ‖Labour Education | 1.0 | 16 | 16 | | | | | 2 | | | | | | | |
| | | | 0410011101 | W– ƒ 6âI ‖College Physical EducationI | 1.0 | 36 | | 36 | | | 2 | | | | | | | | |
| | | | 0410021201 | W– ƒ 6âII ‖College Physical EducationII | 1.0 | 36 | | 36 | | | | 2 | | | | | | | |
| | | | 0410031301 | W– ƒ 6âIII ‖College Physical EducationIII | 1.0 | 36 | | 36 | | | | | 2 | | | | | | |
| | | | 0410041401 | W– ƒ 6âIV ‖College Physical EducationIV | 1.0 | 36 | | 36 | | | | | | 2 | | | | | |
| | | K à K J 2« Innovation and Entrepreneurship courses | 1557011002 | KFPWM5$> K à é# ‖Creative Thinking and Innovative Methods | 1.0 | 16 | | | | | | | 2 | | | | | | |
| | | | 1740011001 | K J * .p ‖Entrepreneurial Foundation | 1.0 | 16 | 16 | | | | | | | 2 | | | | | |
| | | ó*6 • ç 2« Mental Health Courses | 0510041001 | W–+Oó*6 > • ç %6â ‖Mental and Health Education for College Students | 1.0 | 16 | 16 | | | | 2 | | | | | | | | |
| | | ?AÑ Subtotal | | | 43.5 | 816 | 576 | 144 | 24 | 72 | 12 | 18 | 12 | 14 | 6 | 3 | 3 | 2 | |
| | F9 Optional | 6 j 4ÿ#~1Ñ*62«Ä1 Å Ã5⅜6â2«Ä2 Å Ã0 – ° _2«Ä0 Å Ã " Ä1 Å Ã P5 · F Ä2 Å Ã ] - > F+\| Ä2 ÅB.0; 2«6 Z Q ‡ !ÿ Z Q ‡ 0 J F9 2.0 – 6 È!ÿ – O 0 J F9 2 L B.0; Ä Including 6 modules: Economic Management Ä1 Å, Aesthetic Education Ä2 Å, Science and Technology Ä0 Å, Four Histories Ä1 Å, Traditional Chinese Culture Ä2 Å, China and The world Ä2 Å. Up to2.0 credits per module and up to 2 courses per semester. | | | | | | | | | | | | | | | | |
| | | ?AÑ Subtotal | | | 8 | | | | | | | | | | | | | | |
| | Î D% Practice | | 0415102011 | ËAÝ ‖military training | 2.0 | 48 | | | | 48 | +2 | | | | | | | | Lö] |

| B.0; 2«[ Course Type | B.0; WCX Course Nature | | B.0; ' Course Code | B.0; =0 Course Name | – 6 Cre. | k – & T.C.H | – & 6G} Credit Hour Distribution | | | | 4 – O˜ – & 6G} Weekly Hours Per Semester | | | | | | | | 7# Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | AâB. Lec. | Î P¼ Exp. | : j Pro. | B. F Î D% Pra. | 0 1st | ¼ 2nd | 9 3rd | 4th | Ä 5th | • 6th | 3 7th | › 8th | |
| | 8AÑ Total | | | | 52.5 | | | | | | | | | | | | | | |
| –0 £ B. Discipline Education | õ Compulsory | – >8 'f 0 –2« Natural Science & Mathematics | 0310004101 | Q 1y – I* ‖Advanced Mathematics I* | 4.5 | 80 | 72 | | | 8 | 6 | | | | | | | | |
| | | | 0310005201 | Q 1y – II* ‖Advanced Mathematics II* | 5.5 | 96 | 88 | | | 8 | | 6 | | | | | | | |
| | | | 0310032001 | 4ï W ‖ Linear Algebra | 2.0 | 32 | 32 | | | | 3 | | | | | | | | |
| | | | 0310042001 | ² )· Aê> *65 AÑ ‖Probability and Statistics | 2.0 | 32 | 32 | | | | | | | 2 | | | | | |
| | | | 1510251002 | = - ‖Function of Complex Variable | 1.5 | 24 | 24 | | | | | 2 | | | | | | | |
| | | | 1511331002 | F (™6 – ‖Modern Physics | 1.0 | 16 | 16 | | | | | | 2 | | | | | | |
| | | | 0310063101 | W–(™6 I* ‖University Physics I* | 3.0 | 48 | 46 | 2 | | | | 3 | | | | | | | |
| | | | 0310063201 | W–(™6 II* ‖University Physics II* | 3.0 | 48 | 46 | 2 | | | | | 3 | | | | | | |
| | | 0; * .p 2« Foundation Engineering | 1510163002 | +eD 6 À * .p * ‖ Fundamentals of circuit analysis * | 3.5 | 56 | 56 | | | | | 4 | | | | | | | |
| | | | 1510913002 | Q +e€ ° _* ‖Analog electronic* technology | 3.5 | 60 | 48 | 12 | | | | | 3 | | | | | | |
| | | | 1510923002 | ‡+e€ ° _* ‖Digital Electronic Technology* | 3.5 | 60 | 48 | 12 | | | | | | 3 | | | | | |
| | | | 1514992002 | Þ j Ï *6 ú Ä+X ‖Microcomputer Principle and Application | 2.5 | 42 | 36 | 6 | | | | | | | 3 | | | | |
| | | | 1510141002 | +e'D 0; f . ú CAD ‖Electrical Engineering Drawing and CAD | 1.5 | 26 | 20 | | 6 | | | 2 | | | | | | | |

| B.0; 2« [ Course Type | B.0; WCX Course Nature | B.0; ' Course Code | B.0; =0 Course Name | – 6 Cre. | k – & T.C.H | – & 6G} Credit Hour Distribution AâB. Lec. | Î P¼ Exp. | : j Pro. | B. F Î D% Pra. | 4 – O˜ – & 6G} Weekly Hours Per Semester 0 1st | ¼ 2nd | 9 3rd | 4th | Ä 5th | • 6th | 3 7th | › 8th | 7# Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1111042002 | F – 8ª – ‖ Chemical Process Technology | 2.0 | 32 | 32 | | | | | | 3 | | | | | | |
| | | 1511364002 | 8 Ø × f Ï *6* ‖The Principle of Automatic Control* | 4.0 | 68 | 56 | 8 | 4 | | | | | 4 | | | | | |
| | | 1513231002 | #{ × ° _ > ˜ C J ² Aê ‖ Introduction to the Specialty of Measurement and Control Technology and Instrument | 1.0 | 18 | 12 | 6 | | | 2 | | | | | | | | |
| | õ | 1514882002 | ' >3+5 I* ‖Signals and Systems I* | 2. | | | | | | | | | | | | | | |
| | Compulsory | C J * .p 2« | | | | | | | | | | | | | | | | |
| –0 £ B. Discipline | Subject Foundation | Requisite | | | | | | | | | | | | | | | | |
| Education | | | | | | | | | | | | | | | | | | |