Talent Cultivation Program for Master's Students in Optical Engineering

Code: 0803

I. Educational Objectives

1. Cultivate patriotism, law-abiding awareness, rigorous, realistic, and innovative scientific ethics, integrity, fairness, and social responsibility.
2. Develop physical and mental health, with strong physical fitness and good psychological qualities.
3. Understand the current research status and development trends in the discipline, and acquire solid foundational knowledge in mathematics and physics. Master comprehensive and robust professional theoretical knowledge, including photoelectric information acquisition, storage, processing, and display; photon-matter interaction and light-energy conversion theories; and foundational knowledge in related fields such as electronic information, artificial intelligence, and materials. Gain in-depth expertise in optical imaging principles, photoelectric detection theory, optical information processing, optical communication technology, laser principles, optoelectronic technology, optical waveguide theory, optoelectronic materials and devices, nonlinear optics, etc.
4. Proficiency in a foreign language for reading professional literature, writing scientific papers, and basic listening, speaking, reading, and writing skills.

II. Research Directions

1. Photonics and Optoelectronic Technology
Focus on key technological demands in environmental monitoring, food safety, etc. Conduct theoretical and technical research on micro/nano photonics and biomedical photonics. Topics include localized surface plasmon resonance-based fluorescence-enhanced sensing methods, high-sensitivity fluorescent sensors for multi-biomolecule detection, and solutions for low sensitivity and high detection limits in multi-target detection.

2. Photoelectric Information Engineering
Address industrial multidimensional intelligent sensing and online precision quality inspection needs. Research advanced optical testing and sensing technologies, such as virtual target-based rapid camera calibration methods, multimodal defect recognition and classification techniques, online dynamic photoelectric detection systems, and solutions for multi-sensor information fusion.

3. Optoelectronic Materials and Devices
Investigate technical demands for new display devices and high-efficiency optoelectronic devices. Study design, fabrication, characterization, and optimization of novel luminescent materials and devices. Topics include multidimensional microstructural material systems, competition and constraints among light-magnetic-electric regulation factors, and challenges in low performance and mutual conversion functionalities of materials/devices.

III. Cultivation Methods and Duration

Duration: Full-time master's program lasts 3 years.
Credits: Total 32 credits required, including ≥18 credits from degree courses and 5 credits from compulsory components.

IV. Curriculum and Credit Requirements

| Course Category| Course Code|Course Name|Hours|Credits|Semester|Teaching Unit|Remarks |
| Degree Courses | 991012 | Theory and Practice of Socialism with Chinese Characteristics | 32| 2 | 2 | Marxism School | Public Compulsory |
| Degree Courses | 991018 | English Intensive Reading | 32 | 2 | 1 | Foreign Language | Public Compulsory
Degree Courses	991019	English Listening and Speaking	32	2	2	Foreign Language	Public Compulsory
Degree Courses	991007	Numerical Analysis	64	4	1	Mathematics	Public Compulsory
Degree Courses	991008	Matrix Theory	32	2	1	Mathematics	Public Compulsory
Degree Courses	111201	Advanced Optics	32	2	1	Electronics	Major Compulsory
Degree Courses	111202	Optoelectronics	32	2	1	Electronics	Major Compulsory
Degree Courses	111203	Optoelectronic Materials and Devices	32	2	1	Electronics	Major Compulsory
Degree Courses	111204	Optical Waveguide Technology	32	2	1	Electronics	Major Compulsory
Degree Courses	111205	Advanced Optical Engineering Experiments	16	1	1	Electronics	Major Compulsory
Degree Courses	111206	Laser Optics	32	2	1	Electronics	Major Compulsory
Degree Courses	111207	Micro/Nano Photonics and Applications	32	2	1	Electronics	Major Compulsory
Non-Degree Courses	991014	Introduction to Dialectics of Nature	16	1	2	Marxism School	Public Elective
Non-Degree Courses	991016	Career Planning and Employment Guidance for Graduates	16	1	1	Electronics	Innovation Elective
Non-Degree Courses	111301	Scientific Paper Writing	16	1	1	Electronics	Major Elective
Non-Degree Courses	111302	Modern Optical Design and Instruments	32	2	2	Electronics	Major Elective
Non-Degree Courses	111303	Virtual Reality and Augmented Reality Technology	32	2	2	Electronics	Major Elective
Non-Degree Courses	111304	Advanced Optical Manufacturing Technology	32	2	2	Electronics	Major Elective
Non-Degree Courses	111305	Fundamentals of Quantum Information Technology	32	2	2	Electronics	Major Elective
Non-Degree Courses	111306	Nonlinear Optics	32	2	2	Electronics	Major Elective
Compulsory Components	-	Thesis Proposal	-	1	3	Electronics	Compulsory Component
Compulsory Components	-	Mid-term Assessment	-	1	5	Electronics	-
Compulsory Components	-	Research Exploration and Practice	-	1	3-5	Electronics	-
Compulsory Components	-	Academic Activities	-	1	3-5	Electronics	Present 1 report
Compulsory Components	-	Graduation Defense	-	1	6	Electronics	-

1. Courses should cover all core subjects of the discipline (refer to *Core Course Guidelines for Academic Degree Programs* and *Core Course Guidelines for Professional Degree Programs*).
2. Provincial-level quality enhancement project courses must be included in the curriculum and marked with "*" before their full titles.

V. Compulsory Components

1. Thesis Proposal

- Conduct extensive literature review (≥50 references, ≥30 in foreign languages) and submit a ≥5,000-word review. The topic must align with the discipline. Proposal defense is completed in Semester 3.

2. Mid-term Assessment

- Conducted in Semester 5 to evaluate course performance, research progress, and address academic challenges.

3. Academic Activities

- Attend ≥10 academic lectures/conferences and present at least 1 conference report.

4. Professional Practice

- Complete ≥16 hours of practice, assessed by advisors or faculty.

5. Graduation Defense

- Thesis defense must occur ≥12 months after proposal approval.
- Thesis must undergo peer review, and the defense committee must include ≥5 experts (≥2 external).

VI. Dissertation

Follow university and national regulations for dissertation writing and evaluation.

VII. Graduation and Degree Conferment

Students who complete required courses, earn credits, pass the thesis defense, and meet university standards will graduate and be awarded the master's degree upon approval by the academic committee.

VIII. Contributors

(Developed/reviewed by national and provincial experts)

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