



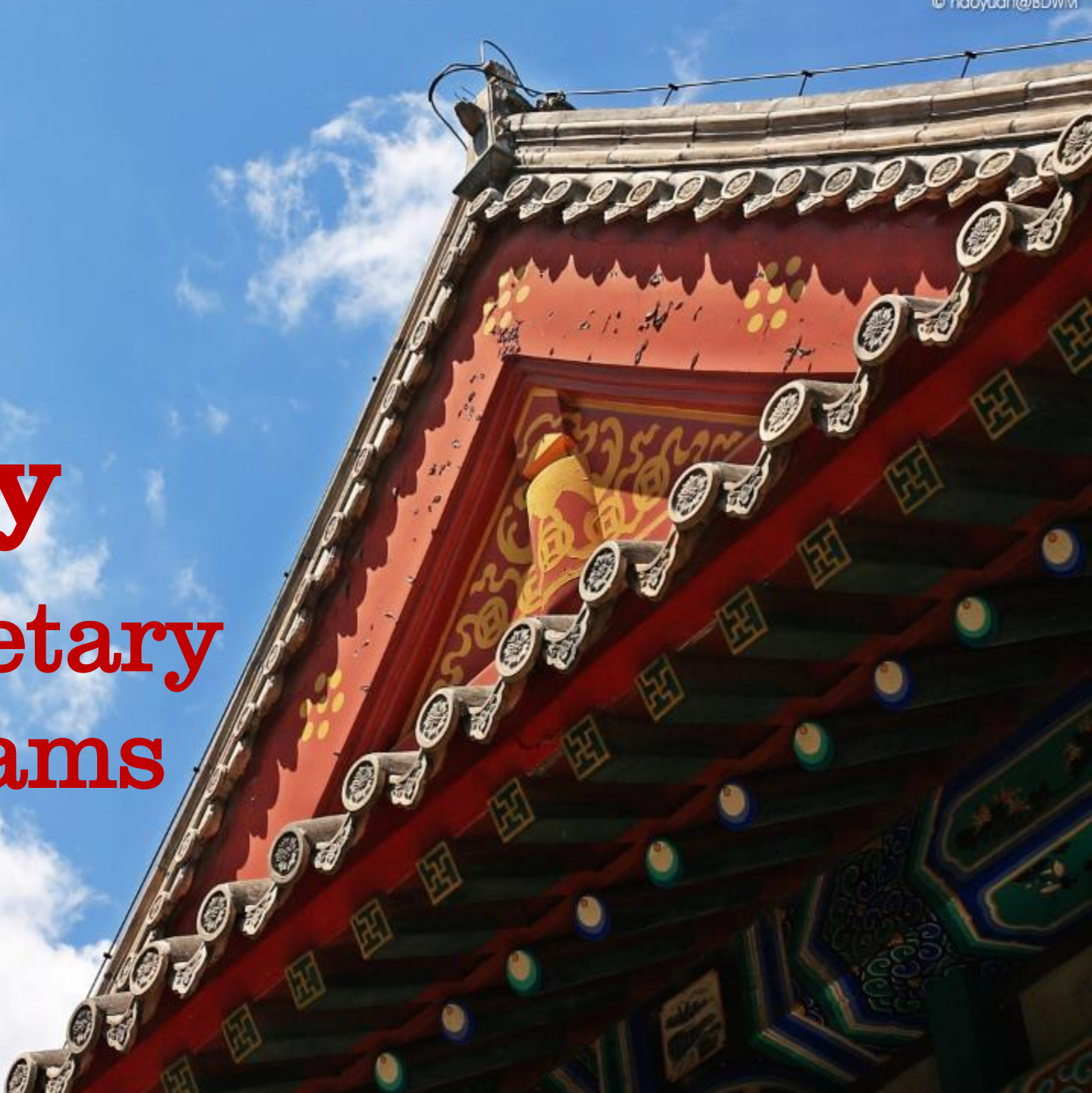
Peking University

Earth and Planetary Science Programs

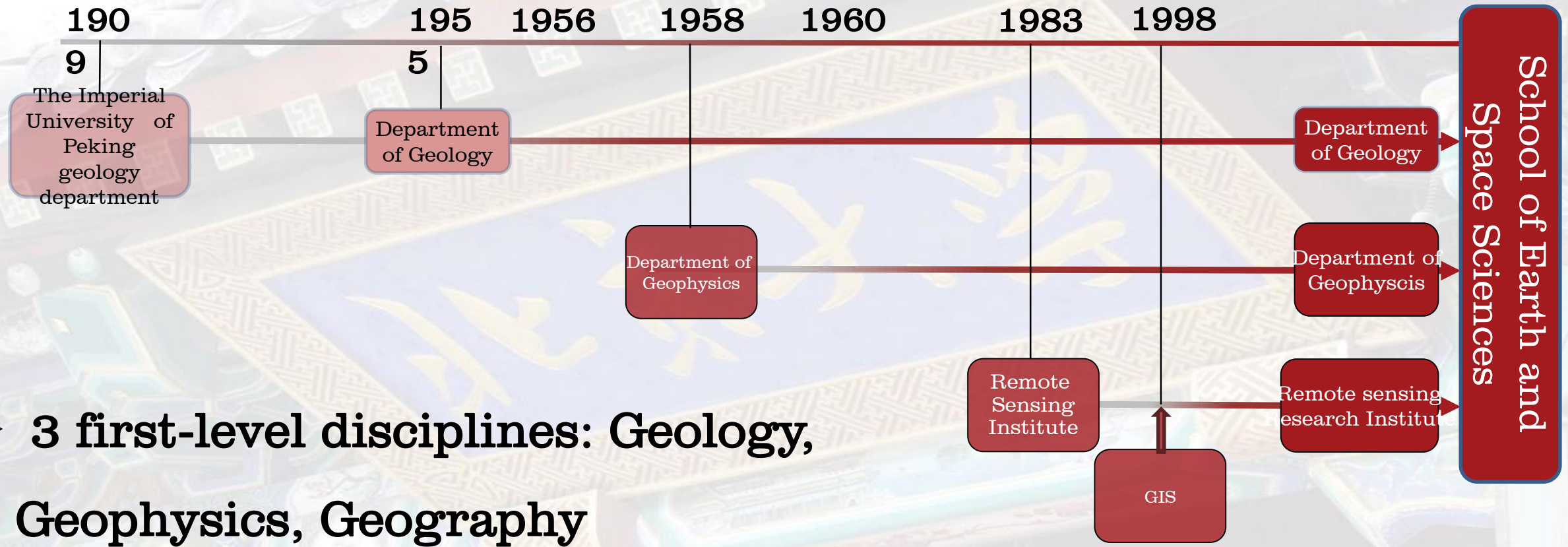
Bing Shen

SESS, PKU

2025.05

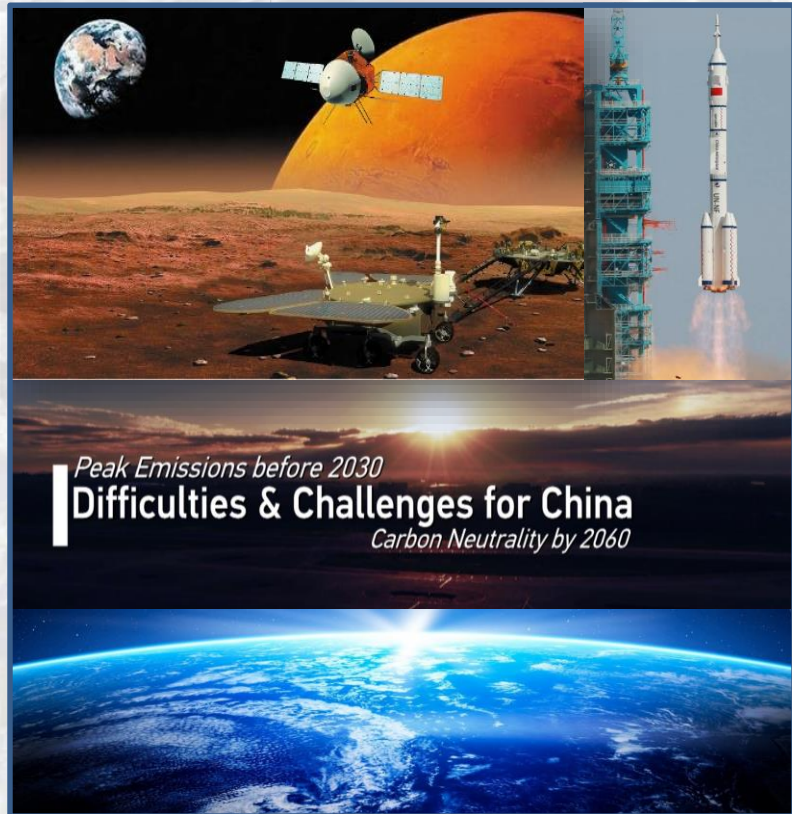


History of SESS-PKU



- 3 first-level disciplines: Geology, Geophysics, Geography
- 8 research institutes (centers)

《Earth and Planetary Science》



1. Earth and Planetary Dynamics

Integrating research teams in geology, space and geophysics, and remote sensing
Focus: 1) The Earth and planetary space environment; And 2) Earth's deep structure
With the circulation of matter; And 3) Earth and planetary dynamics

2 Earth and planetary habitability

Blending research teams in geology, space physics, and remote sensing
Focus: 1) Astrobiology; And 2) Evolution of habitability in Earth's surface systems

3. Remote sensing and space exploration

Integrating remote sensing and space physics research teams
Focus: 1) Advanced remote sensing technology; 2) Earth space-time intelligence;
And 3) Solar system space environment exploration

4. Clean energy and carbon neutralization

Fusion geology, geophysics research team
Focus: 1) Shale gas; 2) geothermal; And 3) gas hydrates

Undergraduate training program



➤ Undergraduate training goals

Scientific leading + interest guiding + ability training
→ Independent - innovative thinking

The leading talents in Earth and planetary sciences with the strong foundation of mathematics, physics, chemistry, and biology; the solid discipline expertise, the international vision, and the critical and innovative thinking

Undergraduate training program



- **Strengthen MPCB background (1-2 grades)**

Strengthen the mathematics (**M**), physics (**P**), chemistry (**C**) and biology (**B**) courses → Training the numerical modelling and analytical ability

- **Build the Earth and planetary background (1-2 grades)**

Setup the new undergraduate course system based on the philosophy of Earth system → Thinking in the level of Earth system

- **Upper-level Personalized training (3-4 grades)**

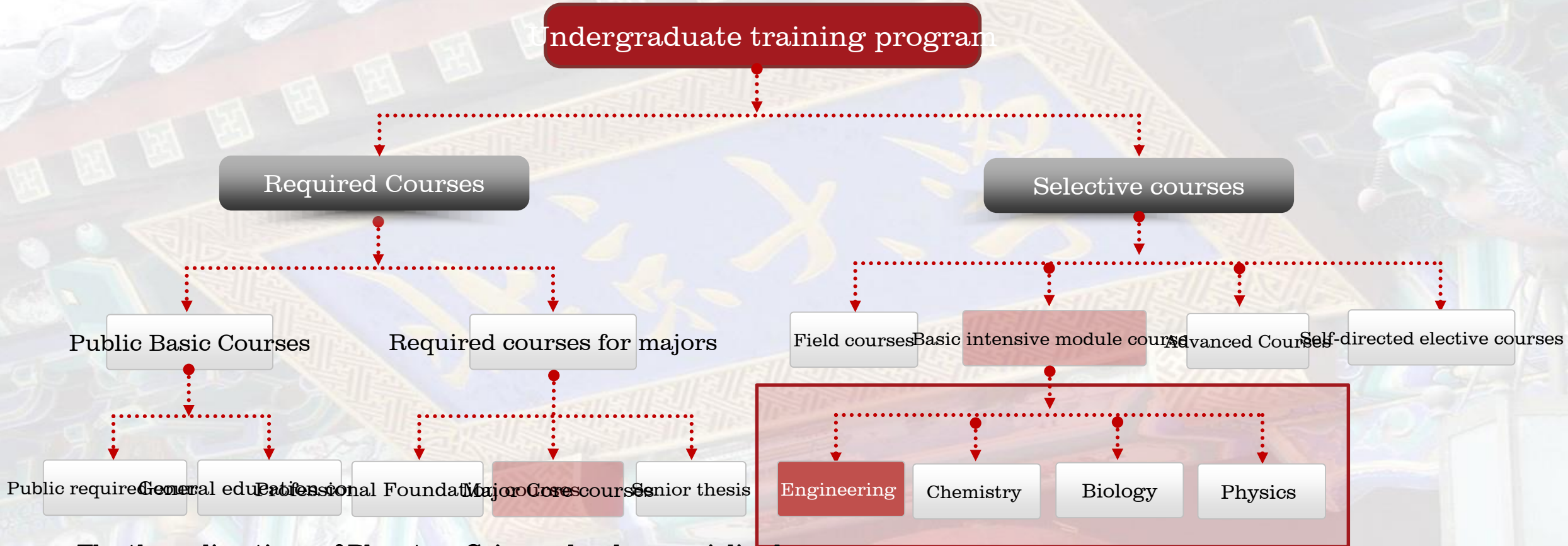
Further enhancing the MPCB background, and higher-level geology-planetary studies under the guidance of academic

tutors

Undergraduate training program



The course system at PKU

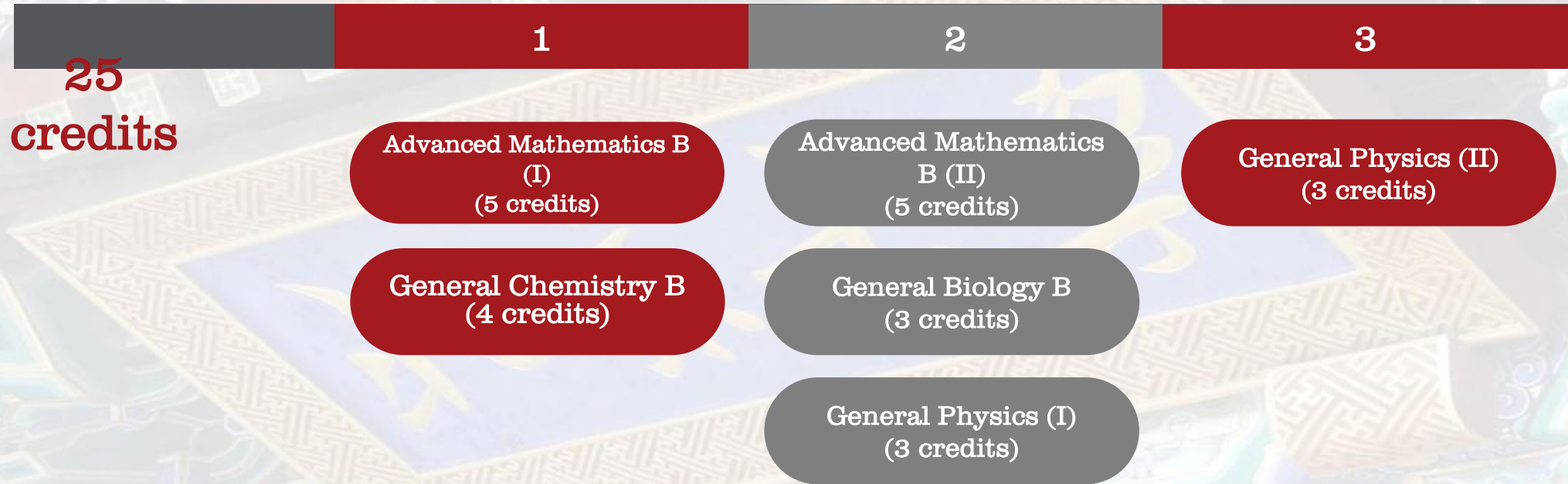


The three directions of Planetary Science develop specialized core courses separately

Undergraduate training program



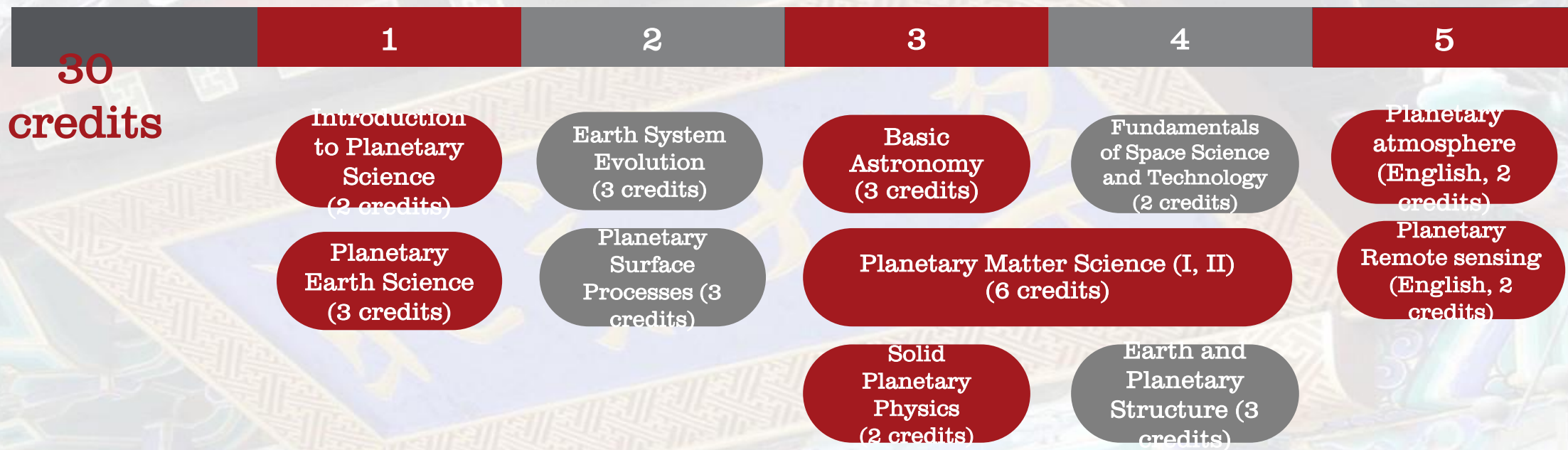
Foundation Courses



Undergraduate training program



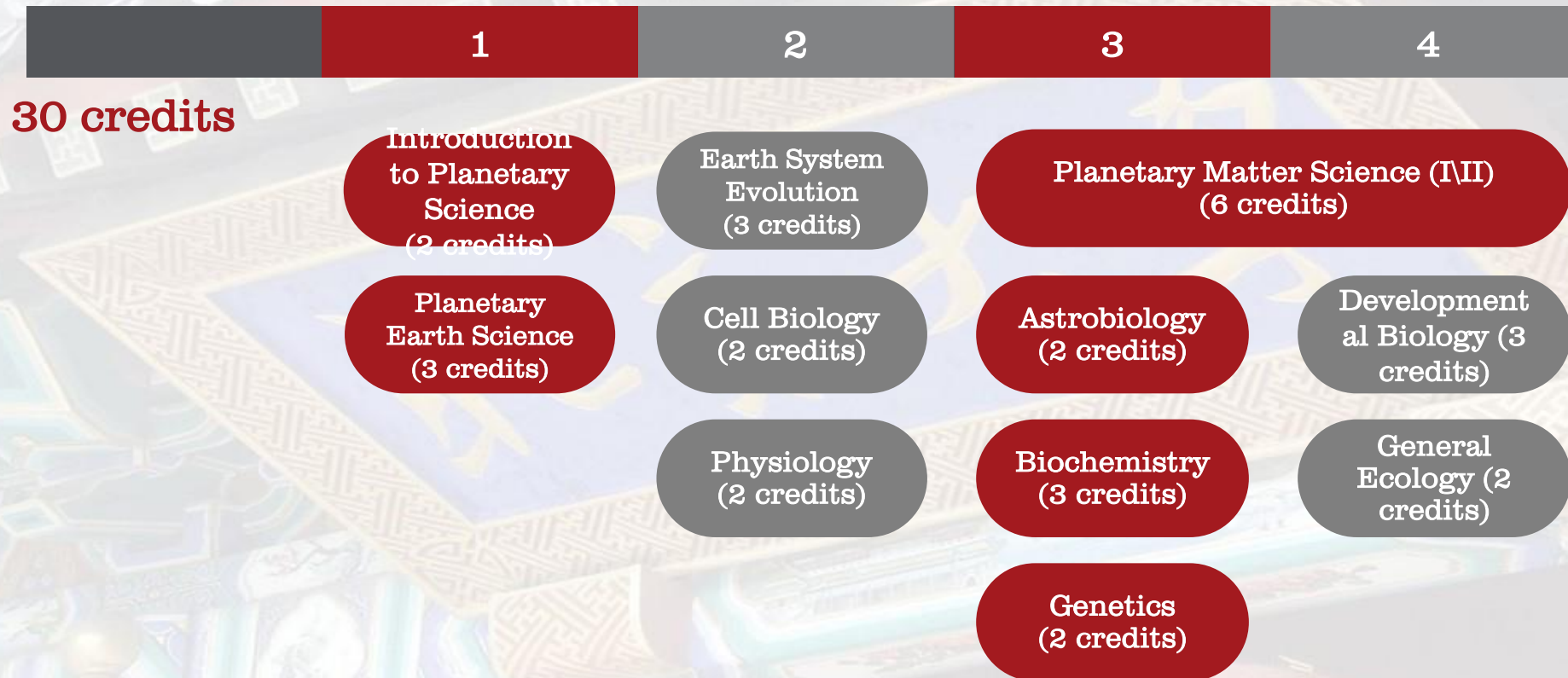
Core courses of planetary science



Undergraduate training program



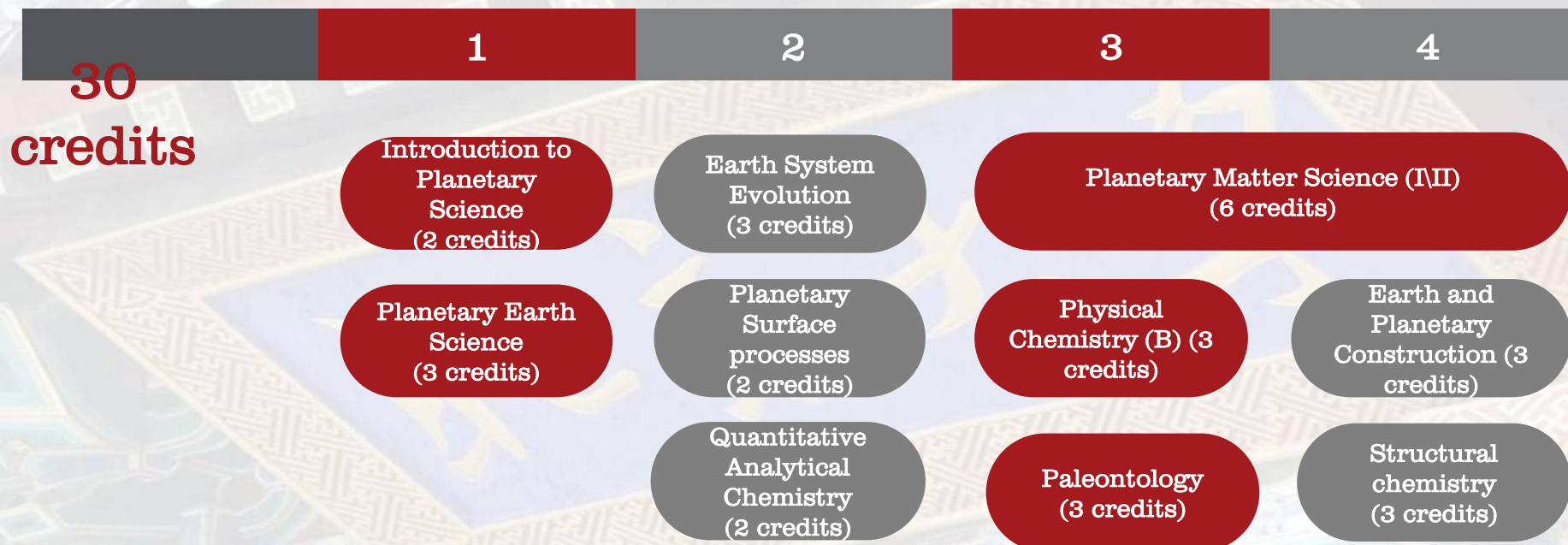
Core courses of Astrobiology



Undergraduate training program



Core courses in Geochemistry



Undergraduate training program

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Module Courses

Physics

- Mathematical Physics Methods (Part 1)
- Mathematical Physics Methods (Part 2)
- Mathematical Physics Methods
- Introduction to Astrophysics
- Fluid Mechanics
- Theoretical Mechanics (A)
- Equilibrium statistical physics or
- Thermodynamics and Statistical Physics
- Computational Physics (A)
- Computational Physics (B)
- Fundamentals of Atmospheric Physics
- Fundamentals of Atmospheric Dynamics
- Introduction to Climatology
- Introduction to Cloud physics
- Introduction to atmospheric chemistry

Chemistry

- Astrochemistry
- Chemical Kinetics
- Fundamentals of Chemical Biology (I)
- Fundamentals of Chemical Biology (II)
- Physical Chemistry (B)
- Structural Chemistry (B)
- Quantitative analytical chemistry
- Quantitative analytical chemistry experiments
- General Chemistry experiments
- Organic Chemistry experiments
- Instrumental analysis
- Organic Chemistry (B)
- Biochemistry
- Intermediate Inorganic Chemistry
- Physical Surface Chemistry

Biology

- Astrobiology
- Molecular biology
- Microbiology
- Cell Biology
- Plant biology
- Developmental biology
- Bioinformatics methods
- Biomathematic modeling
- Biostatistics
- Animal biology
- Biochemistry
- Evolutionary biology
- Genetics
- Structural biology

Mathematics

- Linear Algebra B
- Probability Statistics B
- Mathematical Physics Method B
- Calculation method

Undergraduate training program



Field training/courses

- Freshman: Lenghu Field Joint field course (Qinghai: 2 weeks)
- Freshman: General Geology field course (Hebei: 2 weeks)
- Sophomore: Integrated Sedimentation-Stratigraphy-Paleontology field course (Guizhou: 2 weeks)
- Sophomore: Integrated Mineralogy-Lithology-Structural geology field course (Wutai Mountain: 2 weeks)
- Junior : Integrated geophysics-geology field course on meteorite crater (Liaoning: 1 week)
- Junior: Field-work based Earth System Modeling (Qilian Mountains: 3 weeks)
- Junior: International Alpine field course (2 weeks)

Graduate programs



Major Code	Major	PhD Supervisors	Master's Supervisors
070503	Cartography and Geographic Information Systems	Huang Zhou, Lin Peirong, Liu Yu, Mao Shanjun, Ren Huazhong, Guo Qinghua, Dong Lei, Zhang Fan	Gao Yong,Liu Yuefeng,Sun Min,Tian Yuan,Zhang Yi
070801	Solid Earth Geophysics	Gai Zengxi, Hu Tianyue, Huang Qinghua, Ma Jianwei, Song Xiaodong, Wang Teng, Wang Yanbin, Xue Lian,Yue Han, Zhang Haiming, Zhang Yong, Zhao Li, Zhao Zeyu, Li Jiaqi	
070802	Space Physics	Fu Suiyan, He Jiansen, Tian Hui, Wang Linghua, Yue Chao, Zhang Donghe, Zhou Xuzhi, Zong Qiugang, Zou Hong, Xie Lun, Wang Shan	Yu Xiangqian
070901	Mineralogy, Petrology and Ore Deposits	Lai Yong, Li Wenbo, Liu Pingping, Lv Zeng, Song Shuguang, Tian Wei, Wei Chunjing, Xu Cheng, Zhang Lifei, Wu Chaodong, Li Yang	
070902	Geochemistry	Li Qiugen, Liu Qiong, Liu Xi, Sun Qiang, Tang Ming, Zhang Guibin, Wang Jiuyuan	
070903	Paleontology and Stratigraphy	Huang Baoqi, Jiang Dayong, Li Mingsong, Liu Jianbo, Shen Bing, Shen Jiaheng, Sun Zuoyu, Wang Deming, Xue Jinzhuang, Du Jianghui	
070904	Structural Geology	Chang Liao, He Tao, Huang Baochun, Ji Jianqing, Zhang Bo, Zhang Jinjing, Zhang Nan, Zhang Yuanyuan, Cheng Feng, Wu Hui	
070920	Geology (Materials and Environmental Mineralogy)	Chuan Xiuyun, Li Yan, Lu Anhuai	
070921	Geology (Petroleum Geology)	Dong Lin, Jin Zhijun, Li Jianghai, Liu Kouqi, Liu Quanyou, Lu Hailong, Zhang Kaiqiang, Zhang Chuan	
081602	Photogrammetry and Remote Sensing	Fa Wenzhe, Fan Wenjie, Li Peijun, Liang Cunren, Lin Yi, Qin Jianqi, Zhang Xianfeng, Zeng Zhaocheng, Zhao Hongying	

Master programs



Semester 01	Semester 02	Semester 03	Semester 04	Semester 05	Semester 06
Course	Course		Topical Proposal	Thesis Writing	Thesis review Defense

PhD programs



Semesters

01	02	03	04	05	06	07	08	09	10
Submit Training Plan	Finish Coursework		PhD Qualifying Exam				Topic Proposal	Thesis Writing	Thesis Review & Defense
Submit Training Plan	Finish Coursework	PhD Qualifying Exam			Topic Proposal	Thesis Writing	Thesis Review & Defense	Direct PhD	
Submit Training Plan	Finish Coursework & PhD Qualifying Exam		Topic Proposal	Thesis Writing	Thesis Review & Defense	Normal PhD			
							15	Master-to-PhD	

Future opportunities



Level 1: Student exchange program for undergraduate field course (2-3 weeks)

Level 2: Exchange undergraduate student program (1-2 semesters)

Level 3: International undergraduate programs at PKU (4 years)

Level 4: Co-advise graduate student

Level 5: PhD programs for international students at PKU (5-6 years)



Thank you

Q & A

bingshen@pku.edu.cn