

DEVELOPMENT OF A TEST BLUEPRINT FOR THE ITEM BANK

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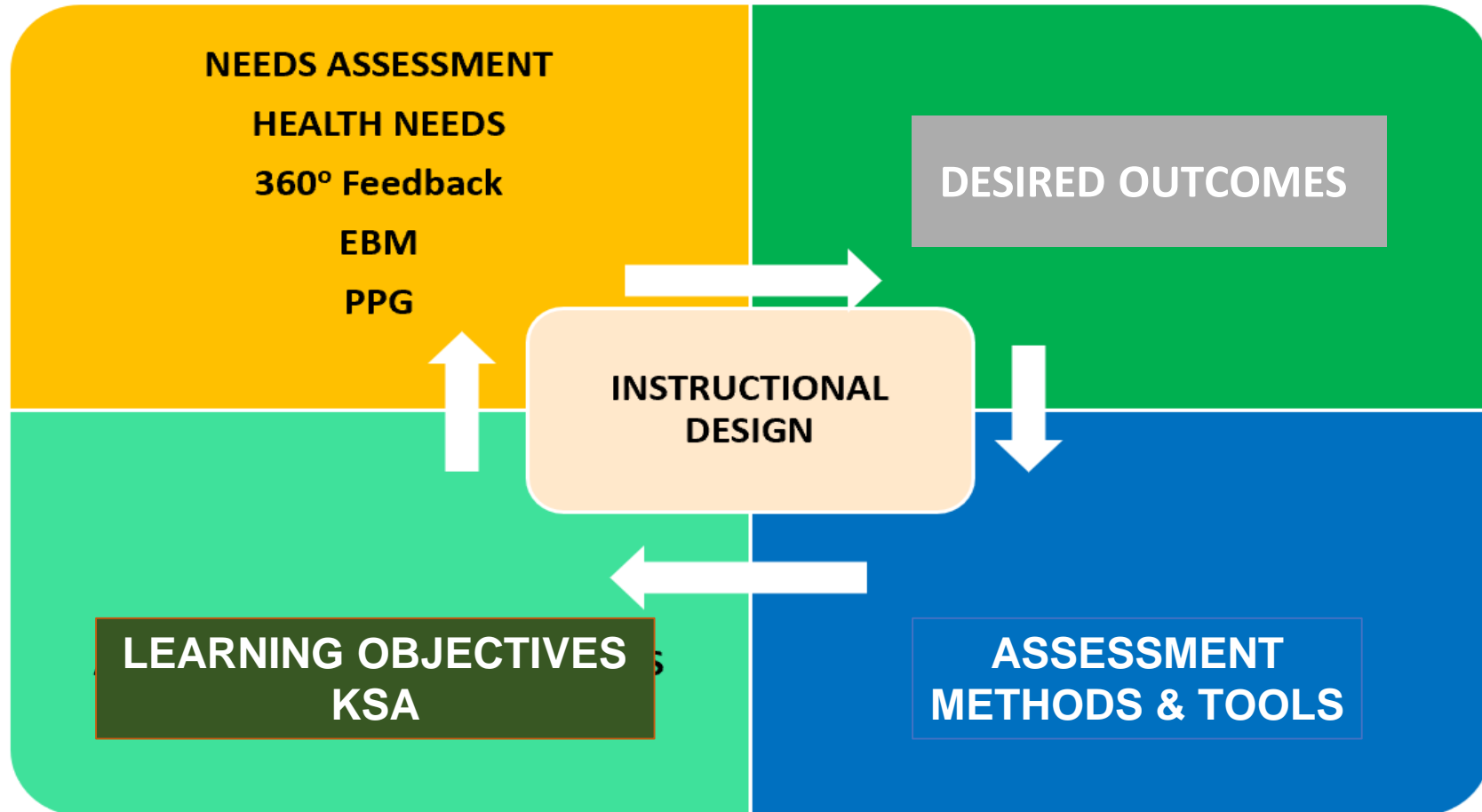
The 8th National Medical Education Conference
Ha Noi - VinUniversity - November 15, 2024

Outlines

1. Introduction to the test blueprint structure
2. Developing a list of essential clinical presentations and content outlines
3. Developing the test blueprint

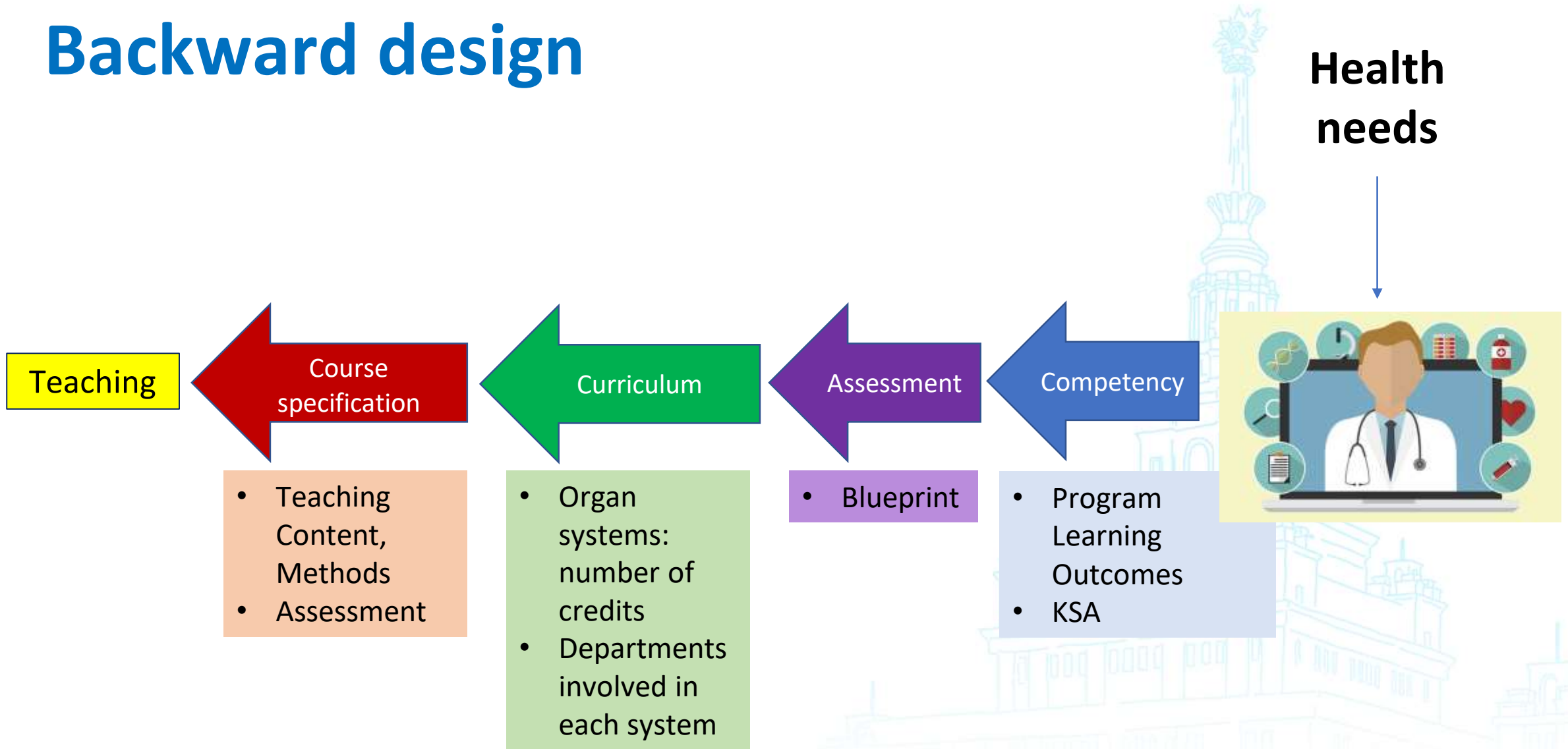


Backward design



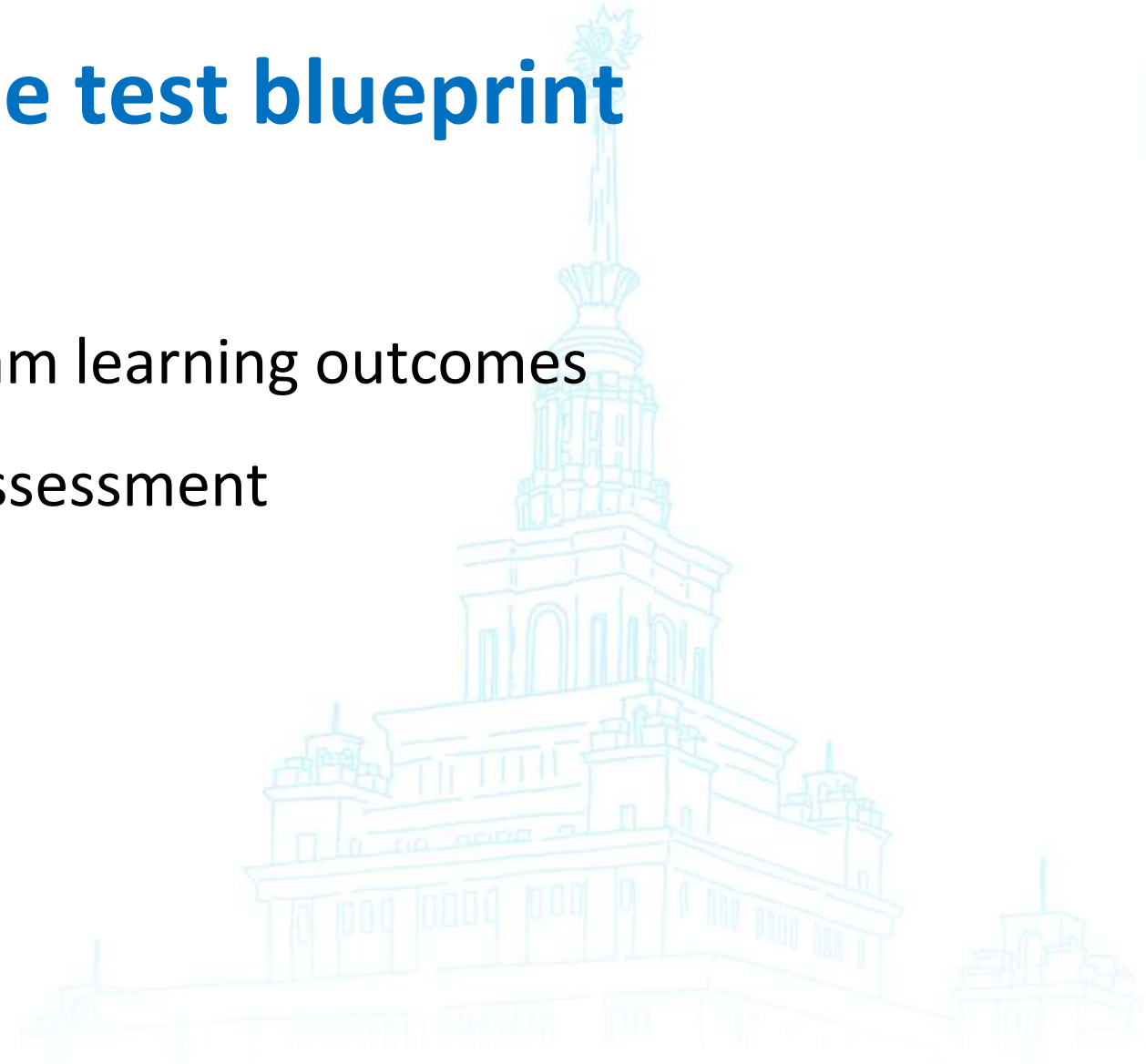
PPG: Professional Practice Gap. KSA: Knowledge – Skill – Attitude
Attitude: thinking → Behavior: action

Backward design

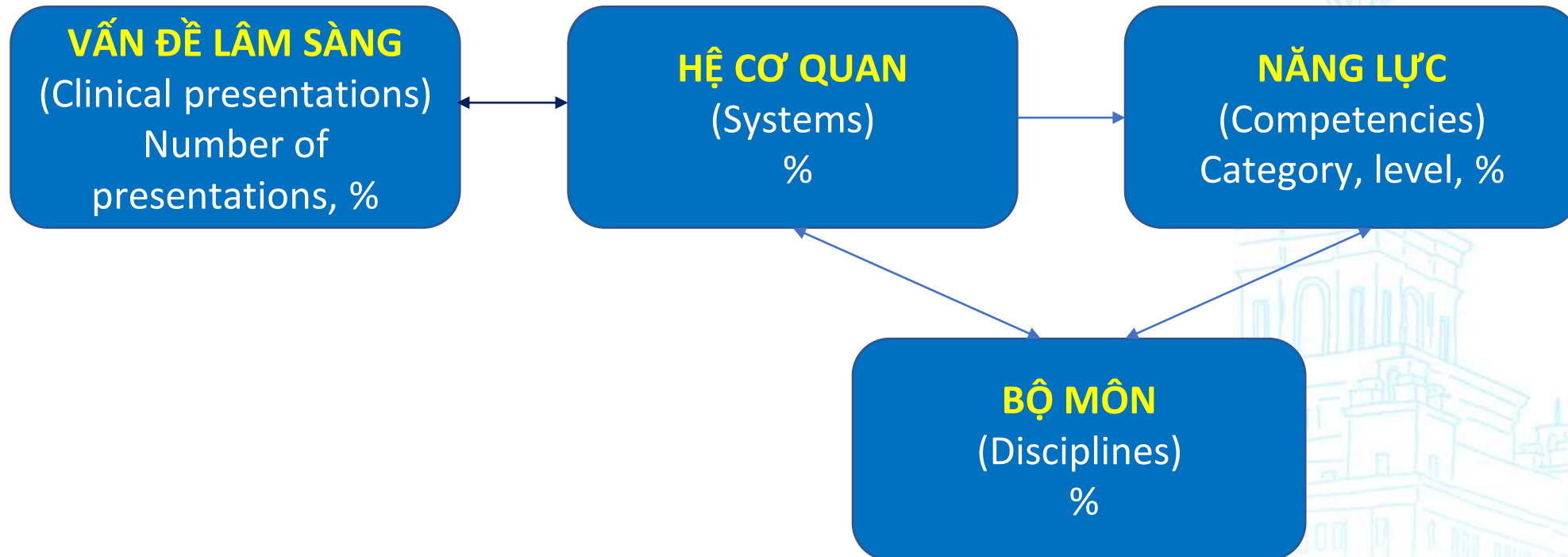


Purpose of developing the test blueprint

- Ensure learners meet the program learning outcomes
- Build an item bank serving for assessment



Test blueprint structure

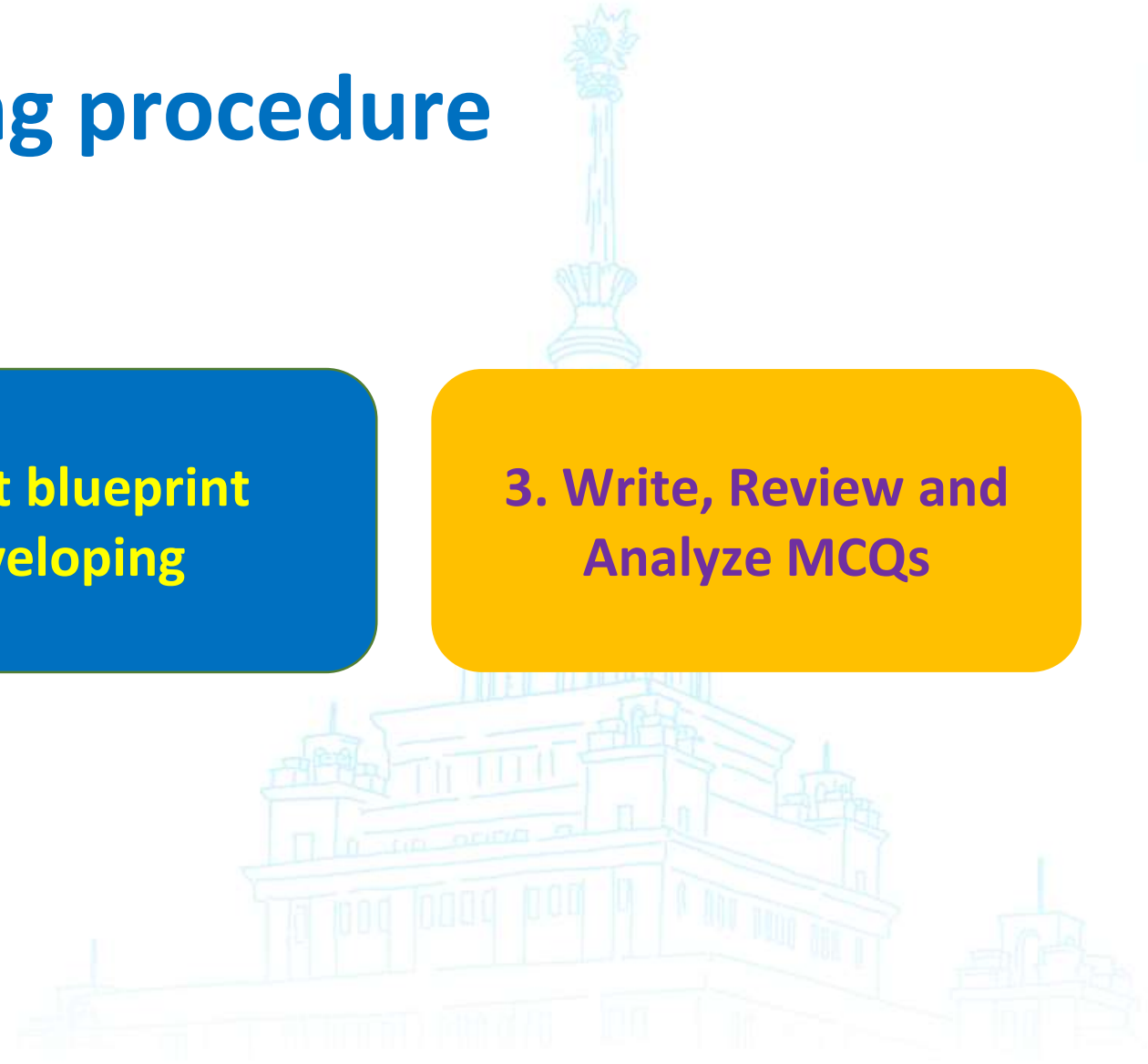


Test blueprint developing procedure

**1. Develop a list of
clinical presentations /
Content outlines**

**2. Test blueprint
developing**

**3. Write, Review and
Analyze MCQs**



Develop each component of the test blueprint

1. Clinical Presentation List
2. Competencies
3. Organ Systems
4. Department / Subject



Building a clinical presentation list

- Find, refer to, and translate the Clinical presentation catalog of some countries.
- Compare and arrange the categories in order (similarity/difference)
- Comments from Head of Department: add/remove
- Agree on the list and survey doctors and lecturers
- Conduct surveys for specialists, residents, and lecturers
- Compare with the course syllabus after surveys
- Adjust names/Briefing clinical presentation

Assessment
Unit

Assessment
Unit

Dept

Core

Assessment
Unit

Core

Dept

Core

Building a clinical issue list

- ✓ Find, refer to, and translate the Clinical presentation catalog of some testis
- ✓ Compare and arrange the catalog (similarity/difference)
- ✓ Comments from Head of Department add/remove
- ✓ Agree on the list and survey data
- ✓ Conduct surveys for specialists, resident doctors, lecturers
- ✓ Compare with the course syllabus
- ✓ Adjust names/Briefing clinical presentations

- US (Texas): 303 items (120 topics); (teaching by Texas): 76 items
- US (Michigan): 96 items
- Canada: 221 items (112 topics)
- Netherlands: 190 items
- Switzerland: 265 items

Summary: 273 items (145 general items + 128 proper items)

Survey on 768 people: 529 specialist; 138 lecturers; 101 resident doctors

Essential Clinical Presentations for the New Graduate

148 clinical presentations

ot

Core

Department Survey

List of CLINICAL PRESENTATIONS/CHIEF COMPLAINT

#	Clinical presentations and survey questions	1. Does the department teach this issue (clinical presentation) in the department's reform curriculum? (0. No, 1. Yes)	2. How important would this issue be for a new medical graduate? (Rated on a scale of 1-4, 1 not essential, 4 very essential)	3. To what level has the department assessed this issue? (0. No assessment, 1. Assessment at the preliminary diagnostic approach level, 2. Assessment at the definitive diagnostic level (determining the cause), 3. Assessment at treatment orientation level, 4. Assessment at the level of specific treatment plan/indication)	4. Should this issue be taught in medical school curricula? (0. No, 1. Yes)	5. Is this issue within the department's field of expertise? (0. No, 1. Yes)	6. In addition to the above issues, is there anything else the department would like to add to the curriculum and assessment for medical doctors? If so, please indicate in this column.
1	Hospital infection	0. No	4. very essential	0. No	1. yes	0. No	
2	Common uncomplicated injuries	0. No	4. very essential	0. No	1. yes	0. No	
3	Pain	0. No	4. very essential	0. No	1. yes	0. No	
4	Fatigue	0. No	3. essential	0. No	1. yes	0. No	

Stakeholder survey

		absolute (n)														Relative (n)													
		Unnecessary				Essential to DETERMINING THE CAUSE				Essential to TREATMENT - MANAGEMENT				Total	Unnecessary				Essential to DETERMINING THE CAUSE				Essential to TREATMENT - MANAGEMENT				Total		
		Dr	Lecturer	Resident	Total	Dr	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total		Doctor	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total			
		Dr	Lecturer	Resident	Total	Dr	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total	Doctor	Lecturer	Resident	Total	Total			
1	Trauma - chest injury	3	1	1	5	29	14	5	48	37	11	3	51	104	3%	1%	1%	5%	28%	13%	5%	46%	36%	11%	3%	49%	100%		
2	Runny nose	8	3	2	13	27	10	5	42	39	9	2	50	105	8%	3%	2%	12%	26%	10%	5%	40%	37%	9%	2%	48%	100%		
3	Nosebleed	4	1	1	6	27	6	1	34	43	15	7	65	105	4%	1%	1%	6%	26%	6%	1%	32%	41%	14%	7%	62%	100%		
4	Nasal congestion	9	3	3	15	22	8	4	34	43	11	2	56	105	9%	3%	3%	14%	21%	8%	4%	32%	41%	10%	2%	53%	100%		
5	Sore throat	6	3	1	10	17	6	5	28	51	13	3	67	105	6%	3%	1%	10%	16%	6%	5%	27%	49%	12%	3%	64%	100%		
6	Wet/dry cough	6	2	1	9	29	17	9	55	49	14	7	70	134	4%	1%	1%	7%	22%	13%	7%	41%	37%	10%	5%	52%	100%		
7	Hemoptysis	0	1	0	1	23	8	5	36	46	17	4	67	104	0%	1%	0%	1%	22%	8%	5%	35%	44%	16%	4%	64%	100%		
8	Wheezing	0	0	0	0	9	4	0	13	30	4	0	34	47	0%	0%	0%	0%	19%	9%	0%	28%	64%	9%	0%	72%	100%		
9	Stridor	0	0	0	0	7	2	0	9	32	6	0	38	47	0%	0%	0%	0%	15%	4%	0%	19%	68%	13%	0%	81%	100%		
10	Acute dyspnea	0	0	1	1	16	5	5	26	88	35	12	135	162	0%	0%	1%	1%	10%	3%	3%	16%	54%	22%	7%	83%	100%		
11	Chronic dyspnea	2	1	3	6	43	17	9	69	59	22	6	87	162	1%	1%	2%	4%	27%	10%	6%	43%	36%	14%	4%	54%	100%		

Content Outline

- Review literature
- Discuss the outlines and assign faculty members to draft the content outline
- Discuss with departments and train faculty members to write the content outline
- Draft content outline
- Summarize content outline and discuss with relevant disciplines on the same clinical presentation
- Report to the Committee of Curriculum Reform

Assessment
Unit

Core

Core

Dept

Dept

Dept

Core

FoM

General Principles of Foundational Science

Biochemistry and molecular biology

Gene expression: DNA structure, replication, exchange, and epigenetics (eg, imprinting, X-activation, DNA methylation)

Gene expression: transcription

Gene expression: translation, post-translational processing, modifications, and disposition of proteins (degradation), including protein/glycoprotein synthesis, intra-extracellular sorting, and processes/functions related to Golgi complex and rough endoplasmic reticulum

Structure and function of proteins and enzymes (eg, enzyme kinetics and structural/regulatory proteins)

Energy metabolism (eg, ATP generation, transport chain)

Biology of cells

Adaptive cell responses and cellular homeostasis (eg, hypertrophy)

Mechanisms of injury and necrosis, including pathologic processes (eg, liquefactive necrosis, free radical formation)

Apoptosis

Cell cycle and cell cycle regulation (eg, mitosis)

Mechanisms of dysregulation

cell biology of cancer (eg, role of p53, proto-oncogenes)

general principles of invasion and metastasis, including cancer staging

Cell/tissue structure, regulation, and function, including cytoskeleton, organelles, glycolipids, channels, gap junctions, extracellular matrix, and receptors

Human development and genetics

Principles of pedigree analysis

Topics:

- Biochemistry-Molecular Biology
- Cellular Biology
- Genetics
- Microbiology
- Pharmacology
- Embryology: Normal Developmental Stages

Respiratory System

Normal Processes

Embryonic development, fetal maturation, and perinatal changes

Organ structure and function

airways, including mechanics and regulation of breathing

lung parenchyma, including ventilation, perfusion, gas exchange

pleura

nasopharynx, sinuses

Cell/tissue structure and function, including surfactant formation, and alveolar structure

Repair, regeneration, and changes associated with stage of life

Pulmonary defense mechanisms and normal flora

Abnormal Processes: Health and Health Maintenance, Screening, Diagnosis, Management, Risks, Prognosis

Infectious, immunologic, and inflammatory disorders

infectious, immunologic, and inflammatory disorders of the upper airways: acute

upper respiratory infection; viral infections (adenovirus, coronaviruses, coxsackievirus, influenza virus, parainfluenza virus, rhinoviruses); sinusitis;

nasopharyngitis; epiglottitis; *Bordetella pertussis* pneumonia; croup; acute

laryngitis; acute laryngotracheitis; tracheitis; pharyngitis; streptococcal throat

infections; tonsillitis; peritonsillar abscess; rhinitis, allergic, chronic; ulcers of nasal cavity/sinuses

infectious, immunologic, and inflammatory disorders of the lower airways: hospital-

acquired pneumonia; ventilator-associated pneumonia, community-acquired

pneumonia, acute bronchiolitis; bronchiolitis obliterans with organizing pneumonia

(BOOP); anthrax, pulmonary (*Bacillus anthracis*); aspiration pneumonia, pneumonitis;

Contents:

Normal Processes

- Embryology
- Structure and Function

Abnormal Processes

- Infectious and Immune Diseases
- Oncology
- Metabolic Diseases
- Congenital Diseases
- Trauma
- Adverse Drug Reactions

...

Multisystem Processes & Disorders

Normal Processes

Principles of nutrition

generation, expenditure, and storage of energy at the whole-body level
functions of nutrients (eg, essential, trans-fatty acids, cholesterol)

Electrolyte and water metabolism

electrolyte metabolism (calcium, potassium, phosphorus)
water metabolism

Intracellular accumulations (eg, pigments, fats, proteins, carbohydrates, minerals, inclusions, vacuoles, lysosomal/glycogen storage disease and structures related to storage diseases, glycogen phosphorylase deficiency, Zellweger syndrome)

Abnormal Processes: Health and Health Maintenance, Screening, Diagnosis, Management, Risks, Prognosis

Infectious, immunologic, and inflammatory disorders

infectious disorders

bacterial: brucellosis (*Brucella* spp); leptospirosis (*Leptospira interrogans*); Lyme disease (*Borrelia burgdorferi*); melioidosis (*Burkholderia pseudomallei*); miliary (disseminated) tuberculosis (*Mycobacterium tuberculosis*); tularemia (*Francisella tularensis*); toxic shock syndrome; Q fever (*Coxiella burnetii*); anaplasmosis and ehrlichiosis (*Anaplasma* and *Ehrlichia* species); rickettsiosis (Rocky Mountain spotted fever [*Rickettsia rickettsii*])

viral: infectious mononucleosis (Epstein-Barr virus); cytomegalovirus infection; yellow fever; human herpesvirus 8 (HHV-8)

fungal: blastomycosis (*Blastomyces dermatitidis*); candidiasis (*Candida albicans*); coccidioidomycosis (*Coccidioides immitis/posadasii*); histoplasmosis (*Histoplasma capsulatum*)

Topics:

- Nutrition
- Fluid and Electrolyte Balance
- Toxins
- Insect Bites/Stings
- Abuse
- Multiple Trauma
- Shock
- Genetic Syndromes



ĐẠI HỌC Y DƯỢC THÀNH PHỐ HỒ CHÍ MINH
KHOA Y

ĐỀ CƯƠNG
NỘI DUNG CHƯƠNG TRÌNH ĐÀO TẠO
BÁC SĨ Y KHOA

LƯU HÀNH NỘI BỘ

•List of clinical presentations: 148 clinical presentations

- 13 Organ Systems
- Multiple Organ Disorders
- Biomedical Statistics and Literature Interpretation
- Medical Ethics and Professionalism

•Content outline

- Integration
- Agree on terminology
- Agree on learning objectives and test competency levels between disciplines
- Writing style: Normal process, pathological process



Curriculum Reform Steering Committee
Meeting January 4th, 2022





Departments' Head Meeting
January 11, 2022





Summary of content outline - Meeting of the
relevant departments on the same clinical
presentation
February 18, 2022



Competence: Type, level, rate

Qualification		Step 2 (%)	Blueprint (%)
Diagnose	Medical Knowledge: Applying Basic Science Concepts	0	1-3
	Patient Care: History and Physical Examination	0	1-3
	Patient Care: Paraclinical / Diagnostic Tests	13 – 17	13-17
	Patient Care: Diagnosis	16 – 20	16-20
	Patient Care: Prognosis / Outcome	5 – 9	5-9
Treatment	Patient Care: Health Maintenance / Disease Prevention	8 – 12	8-12
	Patient Care: Drug Therapy	8 – 12	8-12
	Patient Care: Clinical Interventions	6 – 10	6-10
	Patient Care: Collaborative Management	12 – 16	12-16
	Learning and improvement based on practice	3 – 5	1-3
	Communication and professionalism	5 – 7	3-5
	Systems-Based Practice and Patient Safety	5 – 7	1-3



Organ systems

- USMLE Step 2

System	Range, %
General Principles of Foundational Science**	2-4
Immune System	3-5
Blood & Lymphoreticular System	4-6
Behavioral Health	6-8
Nervous System & Special Senses	6-8
Musculoskeletal System/Skin & Subcutaneous Tissue	6-10
Cardiovascular System	8-10
Respiratory System	7-9
Gastrointestinal System	7-9
Renal & Urinary System & Male Reproductive	4-6
Pregnancy, Childbirth & the Puerperium	4-6
Female Reproductive System & Breast	4-6
Endocrine System	4-6
Multisystem Processes & Disorders	4-6
Biostatistics & Epidemiology/Population Health/Interpretation of Medical Literature	3-5
Social Sciences: Legal/Ethical Issues & Professionalism/Systems-based Practice & Patient Safety	10-15

13 Organ Systems + Multiple Organ Disorders + Biomedical Statistics & Literature Interpretation + Medical Ethics & Professionalism

Background:

- Vietnam's Disease Model
- Output Standards for Medical Doctors

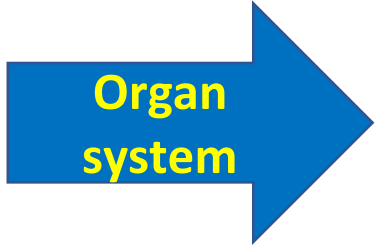
Procedure

- Ratio of total credits of organ systems in the entire program (mainly 3 years)
- Course Syllabus

USMLE

Step 2 Step 3

Organ system	Step 2 (%)	MCQ Step 3 (%)
General Principles of Basic Science	2 – 4	1 – 3
Immune system	3 – 5	6 – 8
Blood, reticulum and lymphatic system	4 – 6	
Multiple organ disease and process	4 – 6	
Behavioral health	6 – 8	4 – 6
Nervous system and senses	6 – 8	8 – 10
Skin and subcutaneous tissue	6 – 10	4 – 6
Musculoskeletal system		5 – 7
Cardiovascular system	8 – 10	9 – 11
Respiratory system	7 – 9	8 – 10
Digestive system	7 – 9	6 – 8
Renal/urinary and male reproductive system	4 – 6	4 – 6
Pregnancy, Childbirth and Postpartum	4 – 6	7 – 9
Female Reproductive System and Breasts	4 – 6	
Endocrine system	4 – 6	5 – 7
Biostatistics and Epidemiology / Population Health and Literature Interpretation	3 – 5	11 - 13
Social Sciences: Communication Skills / Ethics / Patient Safety	10 – 15	7 – 9



Organ system	Lower limit (%)	Upper limit (%)
Immune system – host resistance – infection	3	5
Blood, reticulum and lymphatic system	4	6
Behavioral Health - Mental	2	4
Nervous system	6	8
Skin and subcutaneous tissue	1	3
Musculoskeletal System - Orthopedics	3	5
Cardiovascular system	12	14
Respiratory system	11	13
Digestive system	15	20
Renal/urinary system	8	10
Obstetrics and Gynecology	10	12
Reproductive system	2	4
Endocrine system	3	5
Oncology	0	0
Multi-organ disorder	2	4
Biostatistics and Epidemiology / Population Health and Literature Interpretation	1	1
Social Sciences: Communication skills / Ethics / Patient safety	1	1
Total	84	115

Competency	Range, %
Medicine	50-60
Surgery	25-30
Pediatrics	20-25
Obstetrics & Gynecology	10-20
Psychiatry	10-15 2 - 4%

* Percentages are subject to change at any time.

Subject/ Discipline

Department	Number of credits	Expected rate (by credit) (%)	Determination rate (%)
Internal medicine	22	22	X
Hematology	2	2	X
Endocrine	2	2	X
Neurology	4	4,1	X
Pediatric	12	12,2	X
Infection	4	4,1	X
Psychiatry	4	4,1	X
Family medicine & retail specialties	8	8,2	X
Emergency	2	2	X
Surgery	16	16,7	X
Thoracic and vascular surgery	2	2	X
Obstetrics and gynecology	12	12,2	X
Orthopedics - rehabilitation	4	4,1	X
Oncology	4	4,1	X

Building a summary table of the components of the test blueprint

1. Organ Systems and Disciplines
2. Clinical presentations – Disciplines – Competence
3. Creating an outline of the test blueprint



Building a test blueprint

- ❑ Agree on the list of presentations
- ❑ Decide on the proportion of discipline within test blueprint (discipline-based)
- ❑ Decide on the rate of competencies in the test blueprint (competence-based)
- ❑ Decide on the proportion of organ systems within test blueprint
- ❑ Decide on the ratio of disciplines by organ system
- ❑ Discuss the list of clinical presentations, disciplines and competency levels
- ❑ Create outline blueprint & Disseminate test blueprint to all departments

Core

Core

Core

Core

Core

Assessment

Department

Assessment

Core

Faculty of
Medicine

Core

Systems – Disciplines

CÁC HỆ CƠ QUAN	M ốc dư	Mốc trên %	Mốc dưới (trê	Mốc trên (trên	NỘI	HUYẾT HỌC	NỘI TIẾT	NỘI TK	NHI	NHIỄM	TÂM THẦN	Y HỌC GD và chuyên khoa lẻ	Y HỌC CẤP CỨU	NGOẠI	NGOẠI LỒNG NGỰC	SẢN PHỤ KHOA	CTCH - PHCN	UNG BƯỞU	TỔNG CỘNG (Câu)
Tổng tín chỉ 98 (31 LT + 67 TH)					4 LT + 18 TH	1 LT + 1 TH	1 LT + 1 TH	2 LT + 2 TH	4 LT + 8 TH	2 LT + 2 TH	2 LT + 2 TH	3 LT + 5 TH	1 LT + 1 TH	2 LT + 14 TH	1 LT + 1 TH	4 LT + 8 TH	2 LT + 2 TH	2 LT + 2 TH	
Tỷ lệ % dự kiến của BM																			
Số câu (trên 300 câu)																			
Tỷ lệ % dự kiến của BM - ý kiến mỗi Thầy Cô																			
SỐ CÂU dự kiến của BM - ý kiến mỗi Thầy Cô																			
Sức khỏe hành vi - Tâm thần																			
Hệ thần kinh																			
Da và mô dưới da																			
Hệ cơ xương - CTCH																			
Hệ tim mạch																			
Hệ hô hấp																			
Hệ tiêu hóa																			
Hệ thận/niệu																			
Sản phụ khoa																			
Hệ sinh sản																			
Hệ nội tiết																			
Rối loạn Đa cơ quan																			
Thống kê y sinh học v& dịch tễ + SK dân số và diễn giải y văn																			
Khoa học Xã hội: Kỹ năng giao tiếp / Đạo đức / An toàn cho bệnh nhân																			
TỔNG CỘNG (câu)																			

Thank you for your attention

