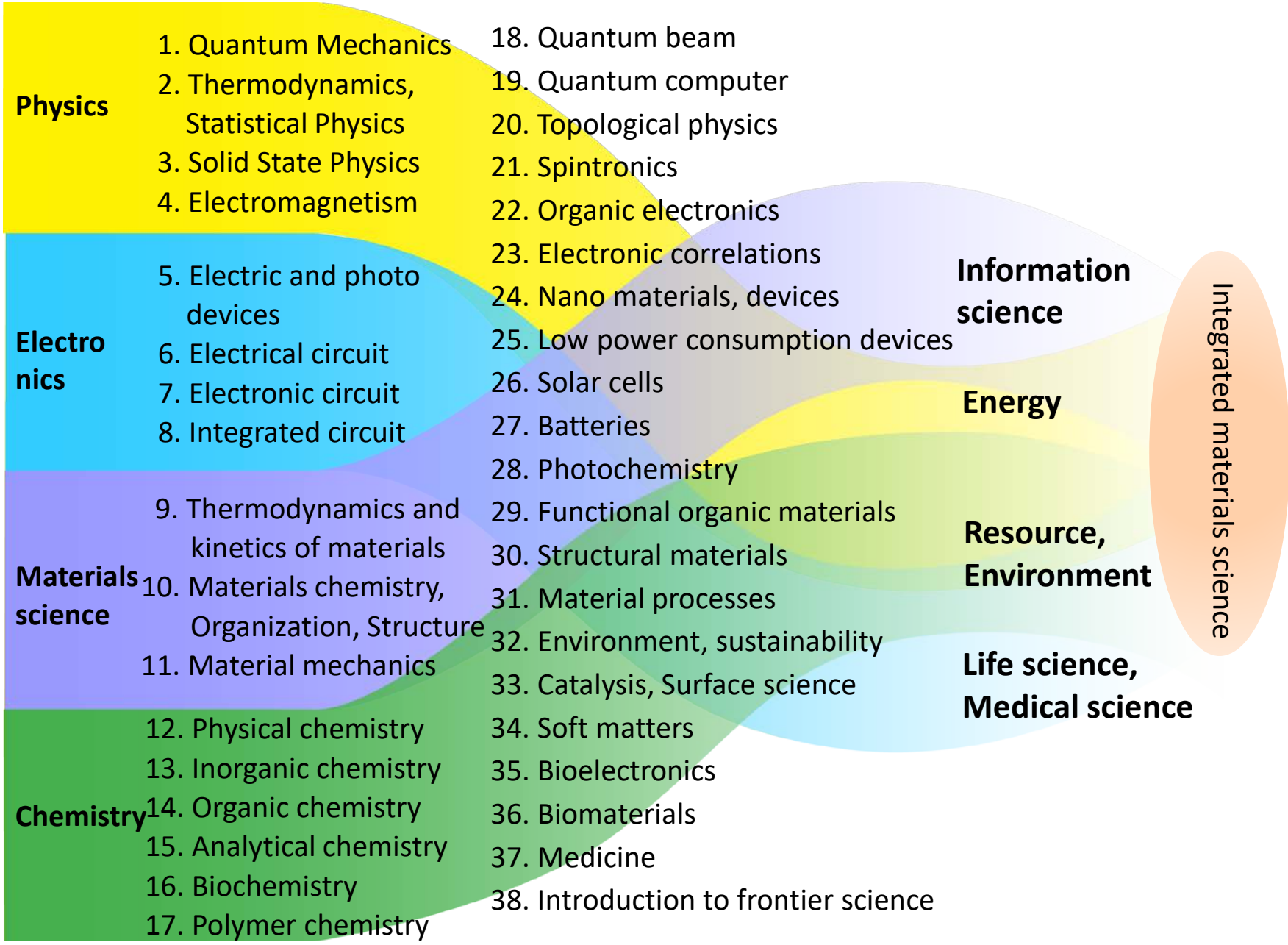
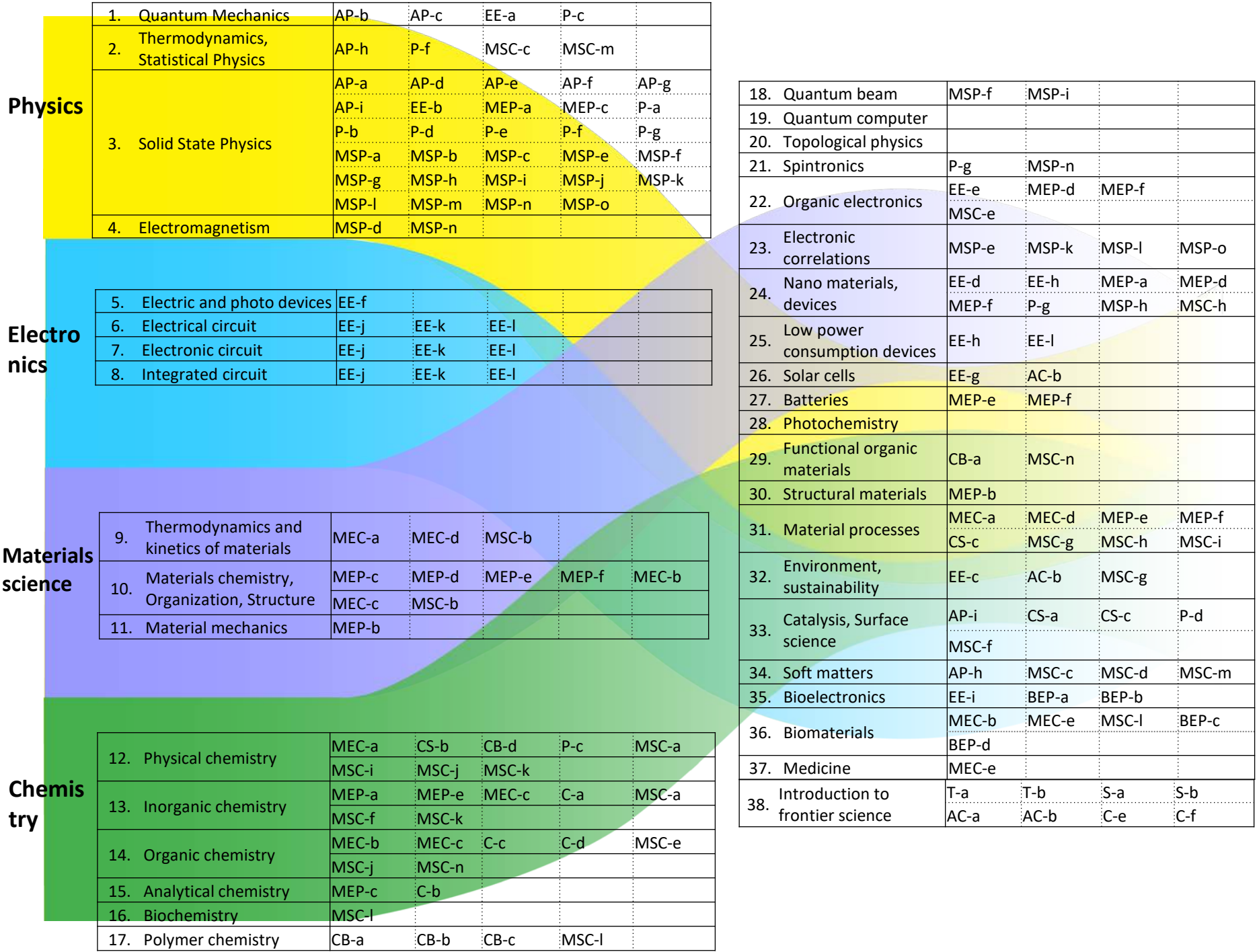
Curriculum design for integrated materials science




Physics
1. Quantum Mechanics AP-b AP-c EE-a P-c
2. Thermodynamics, Statistical Physics AP-h P-f MSC-c MSC-m
3. Solid State Physics AP-a AP-d AP-e AP-f AP-g AP-i EE-b MEP-a MEP-c P-a P-b P-d P-e P-f P-g MSP-a MSP-b MSP-c MSP-e MSP-f MSP-g MSP-h MSP-i MSP-j MSP-k MSP-l MSP-m MSP-n MSP-o
4. Electromagnetism MSP-d MSP-n
Electronics
5. Electric and photo devices EE-f
6. Electrical circuit EE-j EE-k EE-l
7. Electronic circuit EE-j EE-k EE-l
8. Integrated circuit EE-j EE-k EE-l
Materials science
9. Thermodynamics and kinetics of materials MEC-a MEC-d MSC-b
10. Materials chemistry, Organization, Structure MEP-c MEP-d MEP-e MEP-f MEC-b MEC-c MSC-b
11. Material mechanics MEP-b
Chemistry
12. Physical chemistry MEC-a CS-b CB-d P-c MSC-a MSC-i MSC-j MSC-k
13. Inorganic chemistry MEP-a MEP-e MEC-c C-a MSC-a MSC-f MSC-k
14. Organic chemistry MEC-b MEC-c C-c C-d MSC-e MSC-j MSC-n
15. Analytical chemistry MEP-c C-b
16. Biochemistry MSC-l
17. Polymer chemistry CB-a CB-b CB-c MSC-l
18. Quantum beam MSP-f MSP-i
19. Quantum computer
20. Topological physics
21. Spintronics P-g MSP-n
22. Organic electronics EE-e MEP-d MEP-f MSC-e
23. Electronic correlations MSP-e MSP-k MSP-l MSP-o
24. Nano materials, devices EE-d EE-h MEP-a MEP-d MEP-f P-g MSP-h MSC-h
25. Low power consumption devices EE-h EE-l
26. Solar cells EE-g AC-b
27. Batteries MEP-e MEP-f
28. Photochemistry
29. Functional organic materials CB-a MSC-n
30. Structural materials MEP-b
31. Material processes MEC-a MEC-d MEP-e MEP-f CS-c MSC-g MSC-h MSC-i
32. Environment, sustainability EE-c AC-b MSC-g
33. Catalysis, Surface science AP-i CS-a CS-c P-d MSC-f
34. Soft matters AP-h MSC-c MSC-d MSC-m
35. Bioelectronics EE-i BEP-a BEP-b
36. Biomaterials MEC-b MEC-e MSC-l BEP-c BEP-d
37. Medicine MEC-e
38. Introduction to frontier science T-a T-b S-a S-b AC-a AC-b C-e C-f

School of Engineering, All T

Physics/Chemistry

T-a Engineering Ethics【38】
T-b Engineering Competency Ⅱ -Research Internship-【38】

School of Science, All S

Physics/Chemistry

S-a Theory of Science Communication【38】
S-b Practice in Science Communication【38】

Applied Physics AP

Physics

AP-a Materials Science【3】
AP-b Advanced Lectures on Quantum Mechanics【1】
AP-c Fundamentals of Magnetic Resonance【1】
AP-d Introduction to Condensed Matter Physics【3】
AP-e Computics for Materials Science Ⅰ【3】
AP-f Computics for Materials Science Ⅱ【3】
AP-g Experimental Methods in Applied Physics (B)【3】
AP-h Soft Matter Science【2,34】
AP-i Surface Physics【3,33】

Electrical Engineering and Information Systems EE

Physics

EE-a Quantum Nanostructures【1】
EE-b Solid State Electronics Ⅰ【3】
EE-c Environmental Issues and Energy Technology【32】
EE-d Nano Quantum Information Electronics Ⅰ【24】
EE-e Organic Electronics【22】
EE-f Fundamentals of Semiconductor Devices【5】
EE-g Physics and Technology of Solar cells【26】
EE-h Nano Quantum Information Electronics Ⅱ【24,25】
EE-i Bio Electronic and Information Engineering【35】
EE-j Integrated Device Engineering【6,7,8】
EE-k Integrated Circuits Engineering【6,7,8】
EE-l Integrated Power Management Circuits【6,7,8,25】

Materials Engineering ME

Physics P

MEP-a Advanced Lecture on Solid State Physics【3,13,24】
MEP-b Advanced Lecture and Exercise on Elasticity【11,30】
MEP-c Advanced Lecture and Exercise on Structural Analysis【3,10,15】
MEP-d Advanced Lecture on Material Modeling【10,24】
MEP-e Advanced Lecture on Material Synthesis Using Supercritical Fluid【10,13,31】
MEP-f Advanced Lecture on Device Process Engineering【10,24,31】

Materials Engineering ME

Chemistry C

MEC-a Advanced Lecture and Exercise on Transport Phenomena【9,12,31】
MEC-b Advanced Lecture on Materials Chemistry Ⅰ【10,14,36】
MEC-c Advanced Lecture on Materials Chemistry Ⅱ【10,13,14】
MEC-d Advanced Lecture and Exercise on Thermodyanmics【9,31】
MEC-e Advanced Lecture on Medical Materials【36,37】

Applied Chemistry AC

Chemistry

AC-a Advanced Lectures on Frontier Chemistry【38】
AC-b Advanced Lectures on Chemistry and Energy【26,32,38】

Chemical System Engineering CS

Chemistry

CS-a Chemical Engineering of Catalysis【33】
CS-b Molecular Physical Chemistry【12】
CS-c Advanced Chemical Reaction Engineering【31,33】

Chemistry and Biotechnology CB

Chemistry

CB-a Polymer and Functional Materials Chemistry Ⅰ【17,29】
CB-b Polymer and Functional Materials Chemistry Ⅱ【17】
CB-c Polymer and Functional Materials Chemistry Ⅲ【17】
CB-d Basics for Functional Chemistry Ⅰ【12】

Bioengineering BE

Physics P

BEP-a Basic Bioelectronics【35】
BEP-b Overview of Bioelectronics【35】

Chemistry C

BEC-c Overview of Biomaterials (*)【36】
BEC-d Overview of Biodevices (*)【36】

(*) These lectures are held every other year in Japanese or English.

Physics P

Physics

P-a Condensed Matter Physics Ⅰ【3】
P-b Condensed Matter Physics Ⅱ【3】
P-c Chemical Physics Ⅰ【1,12】
P-d Surface Physics【3,33】
P-e Optical Properties and Spectroscopy of Solids【3】
P-f Computational Physics【2,3】
P-g Semiconductors【3,21,24】

Chemistry C

Chemistry

C-a Basic Inorganic/Analytical Chemistry Ⅰ【13】
C-b Basic Inorganic/Analytical Chemistry Ⅱ【15】
C-c Basic Organic Chemistry Ⅰ【14】
C-d Basic Organic Chemistry Ⅱ【14】
C-e Frontiers in Advanced Technology Ⅰ【38】
C-f Frontiers in Advanced Technology Ⅱ【38】

Advanced Materials Science MS

Physics P

MSP-a Introduction to Advanced Materials Science Ⅰ【3】
MSP-b Introduction to Advanced Materials Science Ⅱ【3】
MSP-c Introduction to Advanced Materials Science Ⅲ【3】
MSP-d Introduction to Advanced Materials Science Ⅴ【4】
MSP-e Optical Properties of Solids A【3,23】
MSP-f Synchrotron Radiation Research【3,18】
MSP-g Physics of transition metal oxides【3】
MSP-h Cluster Function Design【3,24】
MSP-i Optical Properties of Solids B【3,18】
MSP-j Magnetism Ⅰ【3】
MSP-k Physics of Quantum Matter【3,23】
MSP-l Introduction to superconductivity and superfluidity【3,23】
MSP-m New Introduction to Advanced Materials Science Ⅰ【3】
MSP-n Introduction to magnetism and spintronics【3,4,21】
MSP-o Strong Correlation Physics【3,23】

Chemistry C

MSC-a Introduction to Advanced Materials Science Ⅳ【12,13】
MSC-b Introduction to Advanced Materials Science Ⅵ【9,10】
MSC-c Introduction to Advanced Materials Science Ⅶ【2,34】
MSC-d Physical Chemistry of Soft Condensed Matter Ⅰ【34】
MSC-e Chemistry and Physics of Organic Functional Materials【14,22】
MSC-f Introduction to Surface Science【13,33】
MSC-g Environmental materials engineering【31,32】
MSC-h Plasma Materials Science【24,31】
MSC-i Non-equilibrium process【12,31】
MSC-j New Introduction to Advanced Materials Science Ⅳ【12,14】
MSC-k New Introduction to Advanced Materials Science Ⅵ【12,13】
MSC-l Introduction to Biological Physicochemistry【16,17,36】
MSC-m New Introduction to Advanced Materials Science Ⅶ【2,34】
MSC-n Nanotechnology in Materials Science【14,29】

＊ lectures in English