



YAYASAN PERGURUAN CIKINI  
INSTITUT SAINS DAN TEKNOLOGI NASIONAL

Jl. Moh. Kahfi II, Bhumi Srengseng Indah, Jagakarsa, Jakarta Selatan 12640  
Telp. 021-7270090 (hunting), Fax. 021-7866955, hp: 081291030024  
Email : humas@istn.ac.id Website : www.istn.ac.id

**SURAT PENUGASAN TENAGA PENDIDIK**  
Nomor : 24 / 03.1 – Gsm /III / 2023  
SEMESTER GENAP TAHUN AKADEMIK 2022/2023.

Nama	: Rudi Saputra, Ir.MT	Status Pegawai	: Tetap
NIK	: 21920009	Program Studi	: Teknik Mesin S1
Jabatan Akademik	: Lektor		

Bidang	Perincian Kegiatan	Tempat	Jam/ Minggu	Kredit (sks)	Keterangan	
I PENDIDIKAN DAN PENGAJARAN	MENGAJAR DI KELAS (KULIAH/RESPONSI DAN LABORATORIUM)					
	1. Material Lanjut (P)	Mesin S1	13:00-15:30, Kamis	3	A	
	2. Metalurgi Ferrous (P)	Mesin S1	12:00-15:00, Rabu	3	A	
	3. Proses Manufaktur 2	Mesin S1	10:00-12:40, Senin	3	A	
	4. Struktur dan Sifat Material	Mesin S1	15:00-17:40, Rabu	3	A	
	5. Metalurgi Ferrous (P)	Mesin S1	12:00-15:00, Sabtu	3	K	
	6. Proses Manufaktur 2	Mesin S1	16:00-18:30, Jumat	3	K	
	7. Struktur dan Sifat Material	Mesin S1	15:00-17:40, Jumat	3	K	
	8. Membimbing Kerja Praktek				1	
	9. Membimbing Tugas Akhir				1	
	10. Menguji Tugas Akhir			1		
II PENELITIAN	1. Penulisan Ilmiah			1		
II PENGABDIAN DAN MASYARAKAT	1. Memberikan Penyuluhan/ Penelitian Ceramah pada Masyarakat			1		
IV UNSUR-UNSUR PENUNJANG						
	Jumlah Total			26		

Kepada yang bersangkutan akan di berikan gaji/honorarium sesuai dengan peraturan penggajian yang berlaku di Institut Sains dan Teknologi Nasional Penugasan ini berlaku tanggal 01 MARET 2023 sampai dengan 31 AGUSTUS 2023..

**Tembusan :**

1. Direktur Akademik - ISTN
2. Direktur Non Akademik - ISTN
3. Ka. Biro Sumber Daya Manusia - ISTN
4. Kepala Program Studi Fak. ....
5. Arsip



**BERITA ACARA PERKULIAHAH E-LEARNING  
(TATAP MUKA DAN KEHADIRAN DOSEN)  
SEMESTER GENAP TAHUN AKADEMIK 2022/2023  
PROGRAM STUDI TEKNIK MESIN, FAKULTAS TEKNOLOGI INDUSTRI  
INSTITUT SAINS DAN TEKNOLOGI NASIONAL**

Mata Kuliah : MATERIAL LANJUT (P)

Kelas : A

Dosen : Rudi Saputra, Ir. MT.

Hari/jam : Kamis/13.00

NO.	Tanggal	POKOK BAHASAN	Jam	Jlh Mhs	Ttd Dosen
1.	16 Mar '23	<i>Advanced Materials</i>	13.00	1	
2.	23 Mar '23	Baja Paduan	13.00	1	
3.	30 Apr '23	Jenis dan sifat Baja Paduan	13.00	1	
4.	06 Apr '23	Komposit	13.00	1	
5.	13 Apr '23	Jenis dan sifat Komposit	13.00	1	
6.	20 Apr '23	Keramik	13.00	1	

Mengetahui,  
Kepala Program Studi

Ir. Ahmad Husen, MSc.

Jakarta, Apr 2023

Dosen,



Ir. Rudi Saputra, MT

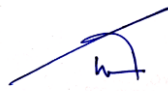





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Kelas : A

Dosen : Rudi Saputra, Ir. MT.

Hari/jam : Kamis/13:00


NO.	Tanggal	POKOK BAHASAN	Jam	Jlh Mhs	Ttd Dosen
7.	27 Apr '23	UTS	13.00	1	
8.	04 Mai '23	Engineering Matrials Ceramiks Lanjutan	13.00	1	
9.	11 Mai '23	Engineering Matrials Polymer	13.00	1	
10.	25 Mai '23	Engineering Matrials Polyimer Lanjut	13.00	1	
11.	08 Juni '23	Engenering Matrials	13.00	1	
12.	15 Juni '23	Matrial Metal Glas- Amorfus	13.00	1	

Mengetahui,  
Kepala Program Studi

Ir. Ahmad Husen, MSc.

Jakarta, Juni 2023

Dosen,



Ir. Rudi Saputra, MT

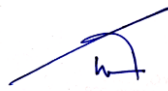
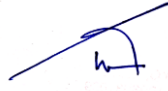
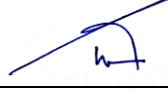
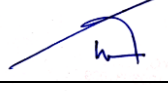
**BERITA ACARA PERKULIAHAH E-LEARNING  
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Mata Kuliah : MATERIAL LANJUT (P)

Kelas : A

Dosen : Rudi Saputra, Ir. MT.

Hari/jam : Kamis/13:00

NO.	Tanggal	POKOK BAHASAN	Jam	Jlh Mhs	Ttd Dosen
13.	22 Juni '23	<i>Matrial Metal Glas - Amarfus Lanjutan</i>	13.00	1	
14.	06 Juli '23	Matrial Nano Tenologi	13.00	1	
15.	13 Juli '23	Matrial Super Konduktor	13.00	1	
16.	27 Juli'23	UAS	13.00	1	

Mengetahui,  
Kepala Program Studi

Ir. Ahmad Husen, MSc.

Jakarta, 27 Juli 2023

Dosen,



Ir. Rudi Saputra, MT

**ABSENSI**  
**UJIAN AKHIR SEMESTER GENAP 2022/2023**  
**FAKULTAS TEKNOLOGI INDUSTRI PRODI TEKNIK MESIN S1**  
**INSTITUT SAINS TEKNOLOGI NASIONAL**

Program Studi : Teknik Mesin S1  
Mata Kuliah : Matrial Lanjut P  
Hari/Tanggal : Kamis/27 Juli 2023  
Waktu : 90 Menit  
Ruang : -  
Sifat Ujian : Virtual Online  
Dosen : Ir. H. Rudi Saputra, MT

NO	N I M	Nama Mahasiswa	Hadir	Tidak Hadir
1	212114705	Raven Rullyanpatra	Hadir	

Dosen Penguji

( Ir. Rudi Saputra.MT )



**DAFTAR HADIR PESERTA KULIAH MAHASISWA  
GENAP - REGULER - TAHUN 2022/2023**

FAK / JURUSAN  
MATAKULIAH  
KELAS / PESERTA  
KURIKULUM  
DOSEN

Teknik Mesin S1  
Material Lanjut (P) / 216310 / 6  
A / 1  
2018  
1.Rudi Saputra, Ir.MT.

HARI / TANGGAL  
Kamis  
JAM KULIAH  
13:00-15:30  
RUANG  
C-2

Hal : 1 / 1

No	N I M	NAMA MAHASISWA	TANGGAL PERTEMUAN							JUMLAH	
			08/5	22/5	30/5	06/6	13/6	20/6	27/6		04/7
1	16210047	IRSYAD YUDHA KHANAFI	ya	ya	ya	ya	ya	ya	ya	ya	8

**CATATAN :**

Perubahan peserta hanya diperkenankan bila ada persetujuan tertulis dari Pelaksana Jurusan.

Jakarta, .....

Dosen Pengajar,

( Rudi Saputra, Ir.MT. )

29/05/2023



**DAFTAR HADIR PESERTA KULIAH MAHASISWA  
GENAP - REGULER - TAHUN 2022/2023**

FAK / JURUSAN  
MATAKULIAH  
KELAS / PESERTA  
KURIKULUM  
DOSEN

Teknik Mesin S1  
Material Lanjut (P) / 216310 / 6  
A / 1  
2018  
1.Rudi Saputra, Ir.MT.

HARI / TANGGAL Kamis  
JAM KULIAH 13:00-15:30  
RUANG C-2

Hal : 1 / 1

No	N I M	NAMA MAHASISWA	TANGGAL PERTEMUAN								JUMLAH
			11/5	22/5	08/6	15/6	22/6	06/7	13/7	4/8	
1	16210047	IRSYAD YUDHA KHANAFI	Y	Y	Y	Y	Y	Y	Y	27/7	8

**CATATAN :**

Perubahan peserta hanya diperkenankan bila ada persetujuan tertulis dari Pelaksana Jurusan.

20/03/2023

Jakarta, .....

Dosen Pengajar,

( Rudi Saputra, Ir.MT. )

## DAFTAR NILAI

### SEMESTER GENAP REGULER TAHUN 2022/2023

Program Studi : Teknik Mesin S1

Matakuliah : Material Lanjut (P)

Kelas / Peserta : A

Perkuliahan : Kampus ISTN Bumi Srengseng Indah

Dosen : Rudi Saputra, Ir.MT.

Hal. 1/1

No	NIM	N A M A	ABSEN	TUGAS	UTS	UAS	MODEL	PRESENTASI	NA	HURUF
			10%	20%	30%	40%	0%	0%		
1	16210047	Irsyad Yudha Khanafi	100	70	75	75	0	0	76.5	A-

Rekapitulasi Nilai							
A	0	B+	0	C+	0	D+	0
A-	1	B	0	C	0	D	0
		B-	0	C-	0	E	0

Jakarta, 3 August 2023

Dosen Pengajar



Rudi Saputra, Ir.MT.



# COMPOSITE MATERIAL

# WHAT IS A COMPOSITE MATERIAL?

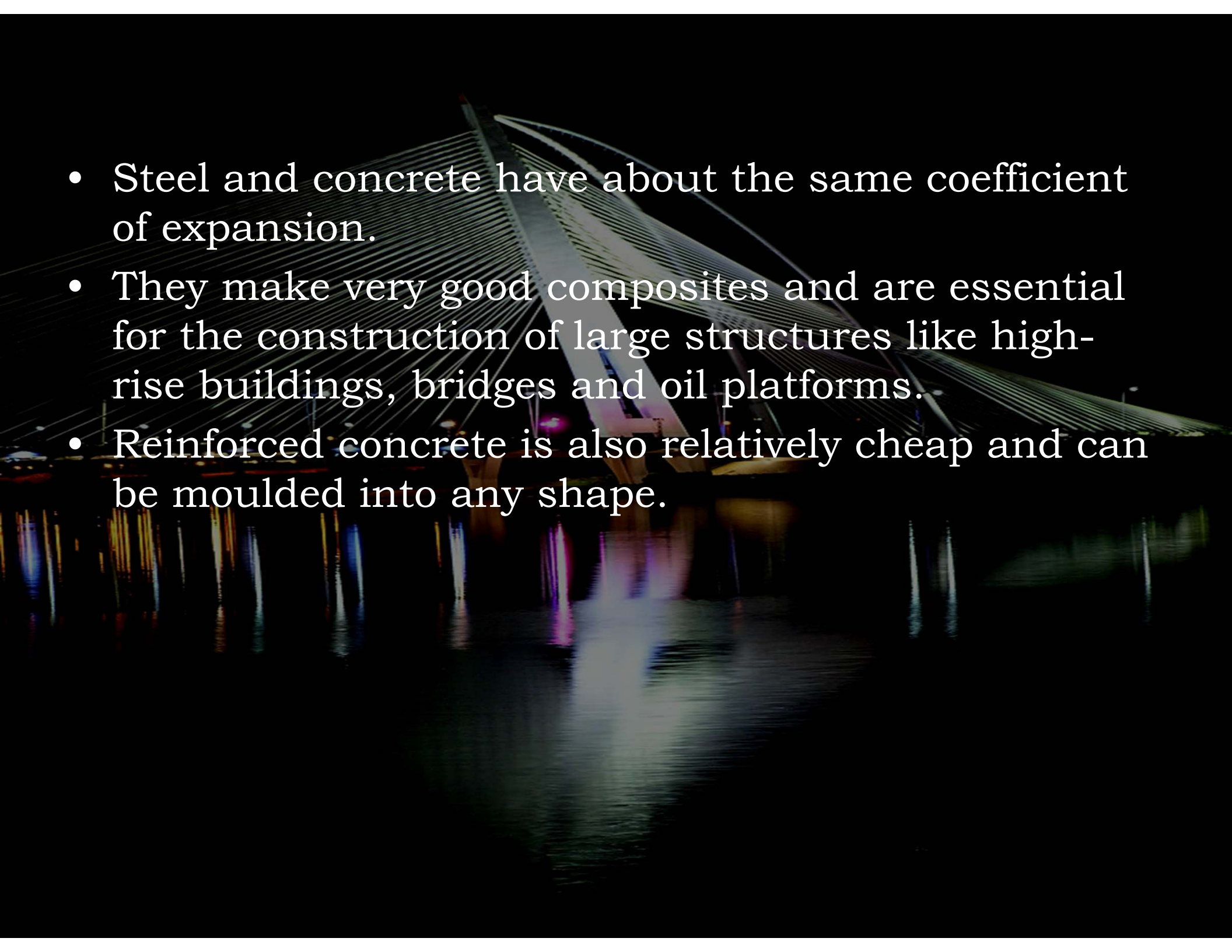
A **composite material** is a structural material that is formed by combining **two or more** different substances such as metal, alloys, glass, ceramics and polymers.

# TYPES OF COMPOSITE MATERIALS

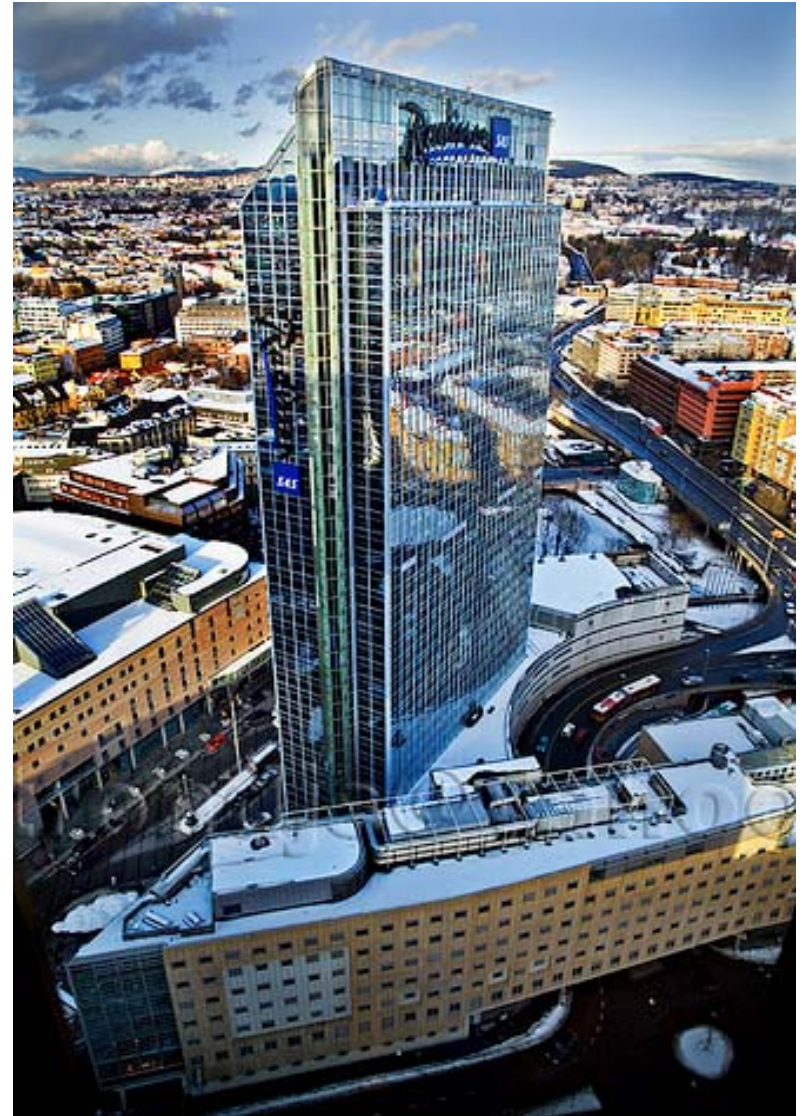
# CONCRETE

- It is a composite material which consists of a mixture of stones, chips and sand bound together by cement.
- It is strong but brittle and weak in tension.  
Steel is strong in tension.
- When concrete is reinforced with steel wires, steel bars or any polymer fibres, the resulting combination is a very tough material with more tensile strength.

This concrete is known as **reinforced concrete**.

- 
- A cable-stayed bridge is shown at night, illuminated with various colored lights (purple, blue, yellow). The bridge's structure, including its pylon and numerous stay cables, is reflected in the dark water below. The background is dark, making the bridge's lights stand out.
- Steel and concrete have about the same coefficient of expansion.
  - They make very good composites and are essential for the construction of large structures like high-rise buildings, bridges and oil platforms.
  - Reinforced concrete is also relatively cheap and can be moulded into any shape.

# CONCRETE



# SUPERCONDUCTORS

- They are capable of conducting electricity without any electrical resistance when they are cooled to extremely low temperature.
- Most of them are alloys of metal compounds or ceramics of metal oxides.
- However, some superconductors are made from composite materials.
- They are used in the bullet trains in Japan and medical magnetic-imaging, MRI.
- They are also used in magnetic energy-store systems, generators, transformers and computer parts.

- Devices made from superconductors have low power dissipation, high-speed operation and high sensitivity.





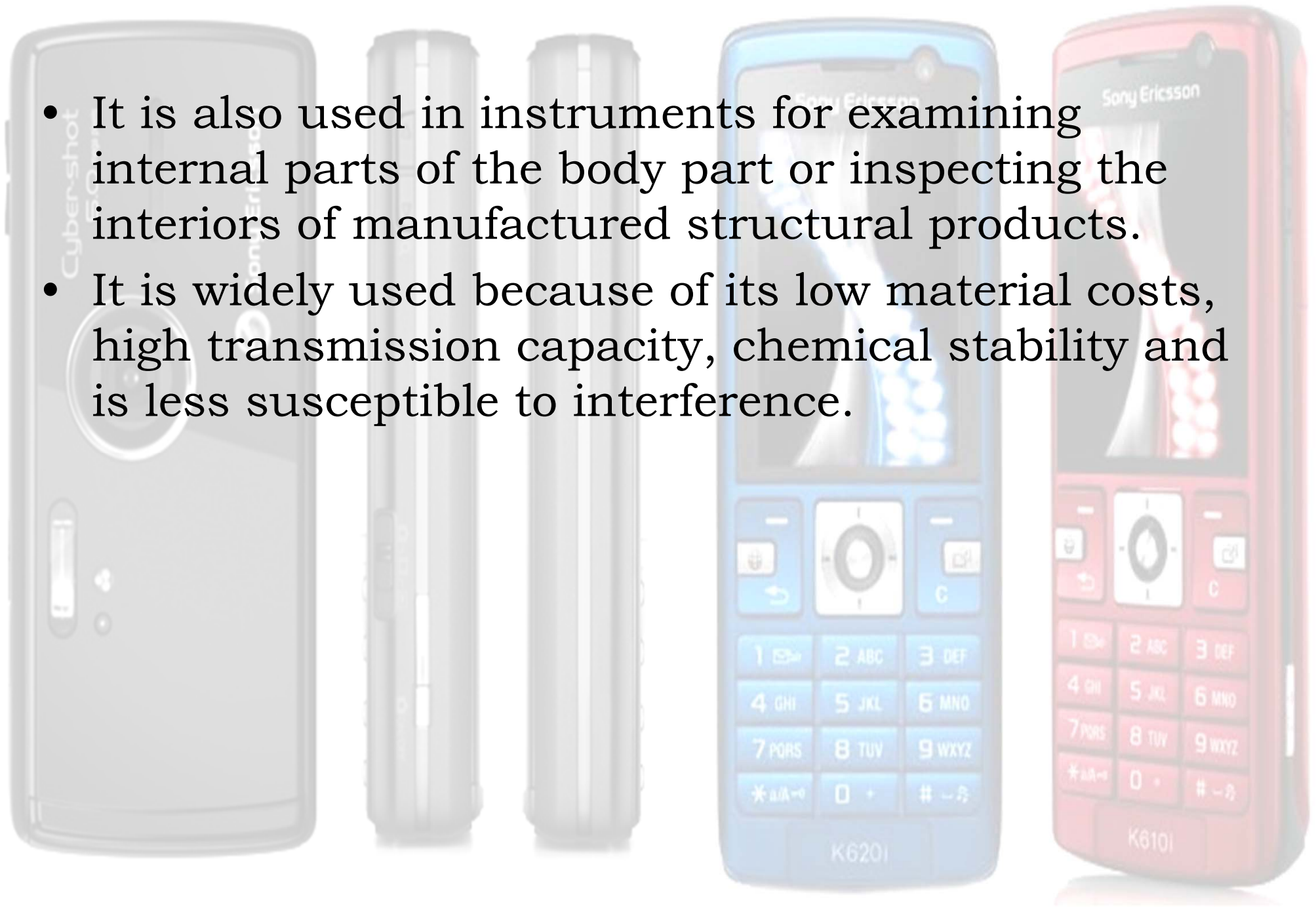
# SUPERCONDUCTORS



# FIBRE OPTIC

- A fibre optic cable consists of a bundle of glass or plastic threads that are surrounded by a glass cladding.
- It is a composite material that is able to transmit data, voice and images in a digital format.
- It is used to replace copper wire in long distance telephone lines, in mobile phones, video cameras and to link computers within local area networks, LAN.

- It is also used in instruments for examining internal parts of the body part or inspecting the interiors of manufactured structural products.
- It is widely used because of its low material costs, high transmission capacity, chemical stability and is less susceptible to interference.

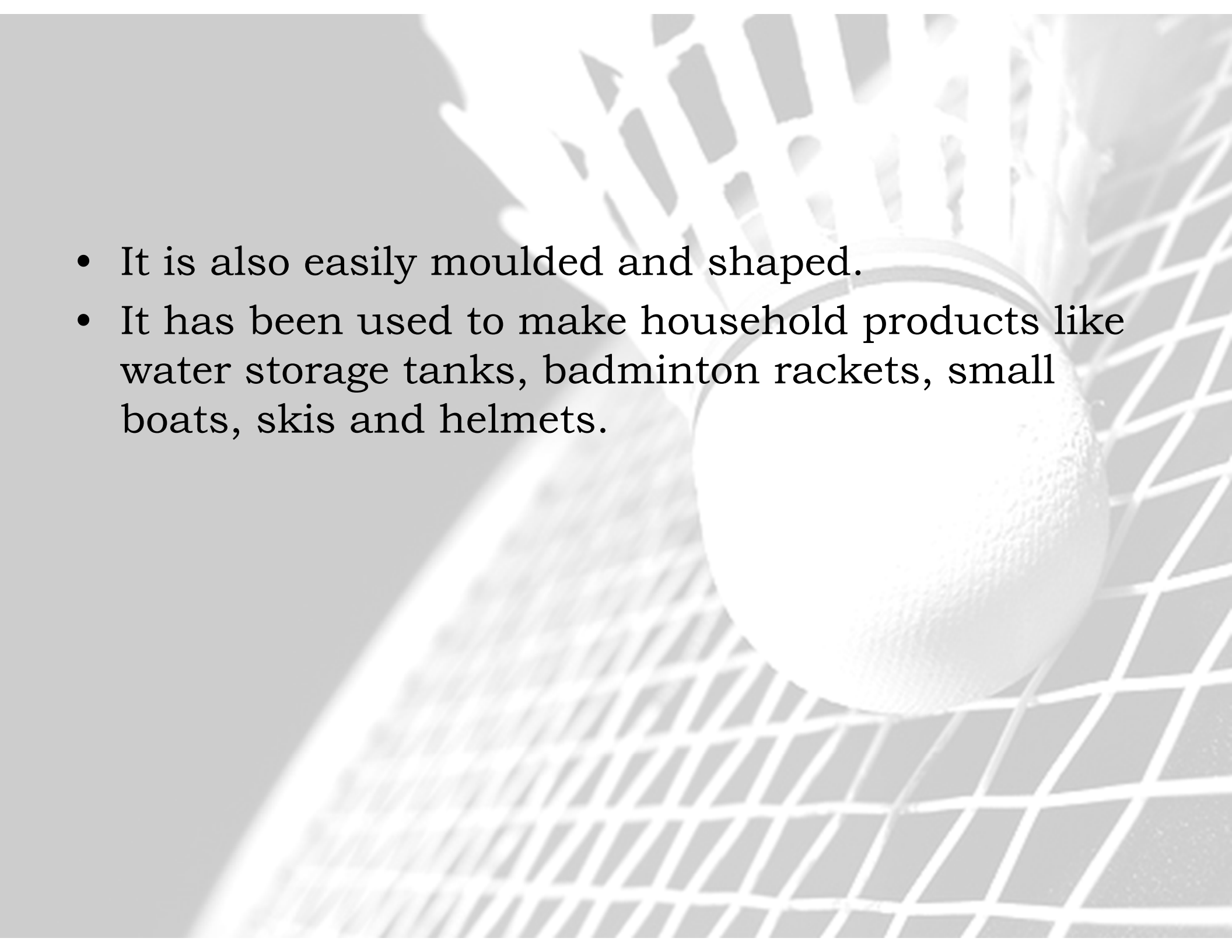


# FIBRE OPTIC



# FIBRE GLASS

- Glass is hard, strong and has a relatively high density.  
However, it is also brittle.
- plastic is elastic, flexible with low density but not as strong as glass.
- When glass fibres are used to reinforce plastic, we get a strong composite material called **fibre glass**.
- Fibre glass has high tensile strength, can be easily coloured and low in density. It can be made into thin layers, yet very strong.

- 
- A white badminton shuttlecock is positioned on a white net. The shuttlecock is in the foreground, slightly to the right, and is in sharp focus. The net is made of a white grid pattern and extends across the background. The background is a soft, out-of-focus grey. The overall image is in grayscale.
- It is also easily moulded and shaped.
  - It has been used to make household products like water storage tanks, badminton rackets, small boats, skis and helmets.

# FIBRE GLASS



# PHOTOCHROMIC GLASS

- it can be produced by embedding photochromic substances like silver chloride,  $\text{AgCl}$  crystals in glass or transparent polymers.
- When it is exposed to light, silver chloride,  $\text{AgCl}$  is converted to silver and the glass darkens.
- The photochromic glass becomes transparent again when silver is converted back to silver chloride,  $\text{AgCl}$  when the light dims.
- It is suitable for making optical lenses, car windshields, smart energy efficient windows in buildings, information display panels, lens in cameras, optical switches and light intensity meters.

GUCCI



# PHOTOCHROMIC GLASS



THE END